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U. S. DEPARTMENT OF AGRICULTURE.

BUREAU OF ANIMAL INDUSTRY—BULLETIN No. 55.

D. E. SALMON, D. V. M., CHIEF OF BUREAU.

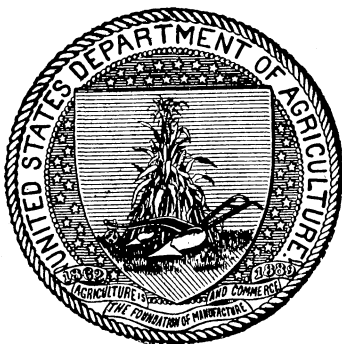
STATISTICS OF THE DAIRY.

COMPILED FROM THE UNITED STATES CENSUS FOR 1900,
AND FROM OTHER RELIABLE SOURCES,
WITH EXPLANATORY NOTES,

BY

HENRY E. ALVORD, C. E.,

Chief of the Dairy Division.



WASHINGTON:
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1903.

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WASHINGTON:
GOVERNMENT PRINTING OFFICE.

1903.

LETTER OF TRANSMITTAL

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF ANIMAL INDUSTRY,
Washington, D. C., March 1, 1903.

SIR: I have the honor to transmit herewith for publication, as Bulletin No. 55 of this Bureau, a compilation by Maj. Henry E. Alvord, Chief of the Dairy Division, of the principal statistics relating to the dairy industry of this and other countries. The development and magnitude of this branch of agriculture are thus shown better than by any available publication, and the information is such as is needed, not only by dairymen, but by the many other persons whose business is closely related to the dairy industry.

The illustrations, which consist of five diagrams and four maps, are necessary to an understanding of the text.

Very respectfully,

D. E. SALMON,
Chief of Bureau.

HON. JAMES WILSON,
Secretary of Agriculture.

LETTER OF SUBMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF ANIMAL INDUSTRY, DAIRY DIVISION,
Washington, D. C., February 25, 1903.

SIR: I have the honor to submit herewith for publication a compilation of the principal statistics relating to the dairy industry in the United States, together with some similar data from other countries.

A part of the figures thus brought together are easily found, but, on the other hand, many of them are inaccessible to people generally. It is believed that the collection as presented will prove interesting and useful to many persons connected with dairying and form a suitable complement to other publications prepared by this division.

The tables are preceded by a discussion of the subject and accompanied by maps and diagrams which serve to illustrate parts of the text.

Yours, respectfully,

HENRY E. ALVORD,
Chief of Dairy Division.

Dr. D. E. SALMON,
Chief of Bureau of Animal Industry.

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STATISTICS OF THE DAIRY.

By HENRY E. ALVORD, C. E.,
Chief of Dairy Division, Bureau of Animal Industry.

A STATISTICAL REVIEW OF THE CENSUS RETURNS.

The latest available statistics of the dairy industry in the United States, considered as a whole, are mainly included in the Twelfth Census. For a comprehensive study of the subject one must bring together some tables in the volume for agriculture and others from that for manufactures. Unless acquainted with the matter, there is the liability of omitting items of importance. There are, in addition, some reliable and interesting data more recent than the United States Census, obtainable from State authorities, although relating to a comparatively few States; and there is also statistical information concerning the dairy in foreign countries which has some influence upon the industry in the United States and which is useful for purposes of comparison.

All of these statistical data have been brought together and will be found in the following pages, arranged in a manner convenient for practical use. The figures for earlier decades are given in connection with the latest, and some general farm statistics are added which have a bearing upon the dairy industry or show its position with relation to other branches of agriculture.

It should be noted that in census statistics all enumerations of persons, farms, animals, etc., are for June of the year stated, while the figures for products of all kinds, although often mentioned in the same connection and sometimes as being for the same year, actually represent the returns for the agricultural year next preceding.

DAIRY FARMS.

The Twelfth Census reports that in the year 1900 there were 5,739,657 farms in the United States, and of these 4,514,210 had dairy cows. Where a farm was found upon which at least 40 per cent of the value of annual products was from dairy products, it was classified as a dairy farm. Of these there were 357,578, or 6.2 per cent, of the total

number, and the average size of these dairy farms was 121 acres. One-sixth of the number ranged from 20 to 50 acres; one-fourth of all, 50 to 100 acres; and rather more than one-fourth, 100 to 175 acres. There were 174,910 "dairy farms" in the North Atlantic States; 108,403 in the North Central Division; 34,940 in the South Central; 27,620 in the Western; 11,671 in the South Atlantic Division, and 34 in Alaska and Hawaii.

DAIRY COWS AND OTHER NEAT CATTLE.

All dairy statistics must be based upon the number of cows contributing to the milk supply. The activity of dairying and the comparative importance of the industry in any country can be primarily determined by the ratio which the number of dairy cows owned bears to the total of other neat cattle. But the reliability of this test depends upon the accuracy with which the different kinds of cattle have been enumerated and classified. The next significant indication is the ratio of cows to inhabitants. The "milch cows" of the United States were first counted by the Sixth Census (1840) and reported as being 4,837,043 in number, or 283 for every 1,000 of the population. The enumeration has been made decennially since that time, with probable varying degrees of accuracy. The ratio of cows to 1,000 people has appeared to be fairly constant, as follows: In 1840, 283; 1850, 275; 1860, 273; 1870, 232; 1880, 248; 1890, 264; 1900, 237; average of the ratios, 259.

The variations are easily accounted for. The sudden decrease from 1860 to 1870 resulted from losses incident to the Civil War, and it required another decade to restore the normal ratio. The ratios in 1890 and 1900, when compared with those of 1850 and 1860, signify improved productiveness of the average cow, especially so as there is reason to regard the number for 1880 as too great; and explanations which soon follow indicate that the same applies to 1890. The average of the stated ratios for sixty years (259 cows) is therefore probably too large. Past errors in this matter have been mainly due to the uncertainty of deciding what was a "milch cow." This term has been too broad and indefinite, and has led to including many under this head which were in no sense dairy animals. It is easily understood that the average dairy cow of the country has been steadily gaining in yield of milk, and, although the consumption of dairy products per capita has doubtless somewhat increased also, it nevertheless requires a less number of cows to supply a thousand people now than was necessary thirty, forty, or fifty years ago.

The enumeration of cows for the Twelfth Census has been made with greater care than ever before. The farm schedule called for "cows kept for milk," and it is believed that this secured practically all animals on farms that could fairly be regarded as dairy cows and

excluded those properly belonging in other classes. The result was that 17,139,674 cows over 2 years old were reported as kept for milk on 4,514,210 different farms. (It is interesting to note that 1,225,447 census "farms," or over 21 per cent of the total number, reported no cows kept for milk.) The cows not on farms or ranges, or what may be called the "town cows," were counted in 1900 for the first time and, surprisingly, found to number 973,033, or $5\frac{1}{2}$ per cent of our entire milking stock. The whole number of what may be considered dairy cows in the year 1900 was therefore 18,112,707. This is believed to be more nearly accurate than any previous enumeration of this class of animals in the United States. There are numerous pieces of external evidence, which can not be quoted here, which support the census results in this particular. (And yet the census authorities believe that a considerable number of cows escaped the count.) These figures should be accepted as the basis of all other dairy statistics until replaced by later and equally satisfactory data.

The probable error in accepting as actual dairy cows the number of "milch cows" reported by the census of 1890 may be shown by a few examples: It is known to be a fact that the dairy cows form at the present time a larger proportion of the total cattle owned, in most of the States, than was the case ten or twenty years ago. This is especially true throughout the East, where dairy cows have notably increased and other cattle have diminished. But the tables of the census for 1890 show the milch cows to be a greater percentage of the total cattle in all of the New England and Middle States, New Hampshire alone excepted, than the dairy cows are shown to be by the census of 1900. In Massachusetts the milch cows constituted 67 per cent of the total cattle in 1890, and the "cows kept for milk" were only 65 per cent of the total cattle in 1900; yet authorities agree that the dairy cows of that State have increased in both actual number and proportion. For New York these percentages are 68 for 1890 and 58 for 1900; in New Jersey, 76 and 66, respectively. The comparison is more striking, however, in States known to have large numbers of beef cattle. In the two Dakotas the milch cows in 1890 were reported as 31 per cent of the total cattle, but in 1900 the cows kept for milk were found to be 18 per cent only of all cattle. In Florida these percentages were, respectively, 23 and 10; in Colorado, 17 and 7; and in Texas, 16 and 9. Texas had 1,000,439 milch cows in 1890, according to the census of that year, whereas only 861,023 were enumerated in 1900; yet the milk product of the State is reported as more than doubled during the decade, and it is a commonly known fact that the dairy cows of Texas have increased greatly in late years; the only explanation is that probably thousands of Texan breeding cattle were erroneously classed as milch cows in the Eleventh Census. Taking the totals for the United States for like comparison, the animals reported as milch cows in 1890

constituted 32.15 per cent of the total cattle on farms and ranges, while in 1900, when we have ample reason for believing the actual percentage of dairy cows to be greater, the "cows kept for milk" constitute 25.27 per cent of all cattle on farms and ranges and only 26.08 per cent of total cattle in all inclosures.

These evidences of error in the enumeration of dairy cows for 1890 render quite unreliable the total number as then reported. The thousands of cows belonging to the beef classes that were counted as dairy animals were in some measure offset by the thousands of town cows and others not on farms, and so not counted at all. But both of these factors are too uncertain to estimate.

It is useless, therefore, to make any further close comparison of the cattle statistics of the Twelfth Census with those of the Eleventh, although the figures for both are placed in the tables on later pages.

The classification for 1900 not only succeeded better in separating the real milch cows from "other cattle," but enumerated the latter in seven classes, by age and sex, as follows: (1) Cows and heifers not kept for milk, 2 years old and over; (2) heifers 1 and under 2 years; (3) calves under 1 year; (4) steers 1 and under 2 years; (5) steers 2 and under 3 years; (6) steers 3 years and over; (7) bulls 1 year and over. The three classes first named and the last included animals of dairy breeding, and the cattle classes were completed by (8) "cows kept for milk, 2 years old and over."

The following summary of all cattle is arranged from the dairy standpoint:

TABLE I.—*Dairy cows and other neat cattle in the United States in 1900.*

Classes.	Number on farms or ranges.	Number not on farms or ranges.	Total.
Cows kept for milk.....	17, 139, 674	973, 033	18, 112, 707
Cows not kept for milk.....	11, 592, 142	75, 767	11, 667, 909
Heifers (yearlings).....	7, 183, 916	79, 517	7, 263, 433
Calves, steers, and bulls.....	31, 906, 604	488, 105	32, 394, 709
Aggregate	67, 822, 336	1, 616, 422	69, 438, 758

There were thus 37,044,049 cows and heifers of all kinds 1 year old and over in this country at the last enumeration, and 48.9 per cent of this number was dairy cows already "in profit" "kept for milk." Of all the cows 2 years old and over, 100 appear to have been for dairy purposes for every 64 kept for breeding and beef.

The geographical distribution of the dairy industry is indicated by these ratios: In the North Atlantic States there were 780 dairy cows to 48 other cows, or 16 to 1; in the South Central Division, 326 dairy cows to 490 cows for breeding and beef, or 1 to 1.5; and in the Western Division, only 207 dairy cows to 603 others, or 1 to 3. "Of the

37,044,049 cows and heifers over 1 year old, 15,580,120, or 42.1 per cent, were found in the North Central Division (of States); 9,504,190, or 25.7 per cent, in the South Central; 4,698,061, or 12.7 per cent, in the North Atlantic; 4,649,595, or 12.6 per cent, in the Western; 2,565,661, or 6.9 per cent, in the South Atlantic Division; and 46,422, or 0.1 per cent, in Hawaii and Alaska." For every farm reporting, there were 14.3 head of neat cattle of all classes and 3.6 cows kept for milk.

The census for 1900 reports the aggregate value of neat cattle in the country as \$1,517,602,351, rather more than one-third of which is assigned to the dairy cows.

PUREBRED CATTLE AND "STATISTICS OF QUALITY."

The following quotations are from the general discussion of neat cattle in the first agricultural volume of the census of 1900:

The Twelfth Census endeavored to secure statistics of the number of pure-blooded cattle and the number of those of special breeds. The attempt, so far as it depended upon the reports of the enumerators, was not successful.

Some attention has been given to breeding cows for dairy purposes only, and with this object in view importations have been made of the Jerseys and Alderneys. There are now many fine herds of both breeds. As the great majority of American farmers keep cattle for beef as well as for milk, they prefer the Herefords and Polled Angus, which are valuable for both purposes.

A statement is made later that, based upon correspondence, the census authorities estimated that in 1900 there were 700,000 "pure-bloods of all kinds" among the cattle of the United States, or about 1 per cent of the total number. The Eleventh Census did more work in this respect. Under the title, "Statistics of quality," it was reported that in the year 1890, taking the country as a whole, 0.99 per cent of neat cattle on farms were purebred, and 16.08 per cent were grades having one-half or more of improved blood. This left 82.93 per cent of common, or native, stock, including grades less than one-half pure-blood. In the North Atlantic States there were then 1.77 per cent of purebred cattle; in the North Central Division, 1.21 per cent; in the South Atlantic, 0.73 per cent; in the South Central, 0.46 per cent; and in the Western Division, 0.52 per cent of the purebred. The highest percentage of grades was then reported in the North Central Division, being 22.21, or a total of 23.42 per cent of all the cattle having one-half or more of improved blood.

Assuming these last returns to have been reasonably correct, there must be now much more than 1 per cent of the neat cattle of the country of the different pure breeds. In a recent review of this subject the writer estimated that, so far as the dairy cattle of the country are concerned, about 2 per cent are now purebred and nearly if not quite half of all the cows are of improved blood.

DAIRY COWS ON FARMS AND RANGES.

The Twelfth Census applies this term to all "cows kept for milk 2 years old or over." Of the total number, already given as 17,139,674, nearly one-half, or 49.5 per cent, were found in the North Central Division of States. In the North Atlantic Division there were 20.4 per cent; in the South Central, 16.9 per cent; in the South Atlantic, 8.1 per cent; and in the Western Division, 5.1 per cent of the total.

The distribution of these cows upon farms (4,514,210) classified by tenure of the farms was as follows: On farms of owners, 10,459,262; part owners, 1,734,648; owners and tenants, 207,162; managers, 295,794; cash tenants, 1,823,713, and share tenants, 2,619,095. There were 579,908 dairy cows upon 348,970 farms of colored farmers. As to distribution on farms of specified areas there was an average of 170 cows to every 100 farms of 3 to 20 acres in area, and this average gradually increased, with much regularity through succeeding groups, to 950 cows for every 100 farms of more than 1,000 acres each.

The foregoing statistics indicate the character of the distribution of the dairy industry in this country, geographically and otherwise. The census gives tables of the number of dairy cows on farms in the several States and Territories, and also by counties therein. The ten most important dairy States rated by the number of cows on farms, June 1, 1900, were the following: New York, 1,501,608; Iowa, 1,423,648; Illinois, 1,007,664; Wisconsin, 998,397; Pennsylvania, 943,773; Texas, 861,023; Ohio, 818,239; Missouri, 765,386; Minnesota, 753,632, and Kansas, 676,456. The only other States having more than half a million dairy cows on farms were Michigan and Nebraska.

DAIRY COWS NOT ON FARMS OR RANGES.

As stated already, this enumeration was made for the first time in the year 1900. All domestic animals in inclosures but not on farms or ranges were included. There were 801,817 different "inclosures" reporting cattle, and it is estimated that 775,000 of these contained dairy cows, which were found to be 973,033 in number. None of the large dairy herds or stables of cities and towns were included, however, because wherever 3 or more cows were reported in one place the matter was specially investigated; and, if it was found that the animals required the constant services of one or more persons, the establishment was treated as a farm. The cows of city dairies in general are therefore included among those tabulated as on farms. Consequently the cows in this "not-on-farms" class were almost all those of owners who kept 1, 2, or 3, and primarily, in most cases, for their own use. They were located, as a rule, in villages, small towns, and the suburbs of larger places rather than in cities. They may be appropriately

called "town cows" as distinct from farm cows, and they constitute 5.4 per cent of all the milking stock of the country.

It is interesting to note that the cows of this class were not found in greatest numbers coincident with the most dense population. Thus nearly one-half of all (45 per cent) were in the North Central division of States, 21 per cent in the South Central, 17.4 per cent in the North Atlantic, 9.6 per cent in the South Atlantic, and 7 per cent in the Western. This distribution follows very closely that of cows on farms. The Twelfth Census gives tables showing the whole number of dairy cows found in 166 named cities of over 25,000 inhabitants, and the number of such cows to 1,000 inhabitants in each of the same cities. From these tables it appears that in 43 cities of 100,000 or more inhabitants each there were 88,600 dairy cows; in 40 cities of 50,000 or more inhabitants, 26,978 cows; and in 83 cities of over 25,000 and less than 50,000 inhabitants, 41,152 cows. There were thus a much greater proportion of town cows in the smaller cities. In the 166 cities named, containing a total population of about 20,000,000, there were 156,730 dairy cows over 2 years old, but of this number 90,146 were tabulated as "on farms," according to the plan adopted, leaving only 66,584 of scattered ownership, or "not on farms." Less than 7 per cent of the town cows was therefore located in cities of more than 25,000 inhabitants. It is thereby again shown that these cows were nearly all kept in the smaller municipalities and in semirural communities.

The States having the greatest number of town cows were Pennsylvania, 78,301; Texas, 63,876; Illinois, 56,827; Iowa, 56,028; Ohio, 50,593; and Missouri, 49,192. The States of Michigan, Kansas, Indiana, New York, Minnesota, and Wisconsin each had between 34,000 and 40,000 of this class of animals.

Greater New York kept 11,577 cows within its limits in 1900, and other cities as follows: St. Louis, 9,481; New Orleans, 6,340; Chicago, 5,901; Philadelphia, 4,981. The only others having as many as 4,000 were St. Paul and Minneapolis. Of the other large cities, Baltimore reported 1,600 and Boston 1,151.

The cities having the greatest number of dairy cows to 100,000 inhabitants (or in that proportion) were as follows: Sioux City, Iowa, 6,850 (or, actually, 2,268 cows to 33,111 people); Council Bluffs, Iowa, 5,058; Des Moines, Iowa, 4,458; and Superior, Wis., 4,053. The cities of Newton, Mass.; Fort Worth and Dallas, Tex.; Joplin, Mo.; Haverhill and Taunton, Mass.; Topeka, Kans.; Little Rock, Ark.; Montgomery, Ala.; and Lincoln, Nebr., had, in the order named, from 3,600 to 3,000 cows to 100,000 inhabitants, or at that rate. Among the great cities, the highest rate was 1,648 in St. Louis and the lowest was 205 in Boston. In New York, Chicago, Philadelphia,

and Baltimore the rate was between 300 and 400 dairy cows to 100,000 population.

The value of these town cows is not given in the census, nor the quantity and value of their products; but there can be no doubt that the cows of this class were of decidedly better quality and higher value than the average dairy cows on farms, and their products were correspondingly greater.

TOTAL DAIRY COWS—THEIR DISTRIBUTION, VALUE, AND PRODUCTS.

The total number of dairy cows in the several States and Territories, including those on farms and ranges and also those in barns and inclosures elsewhere, will be found in Table XIII, page 59. The position of the States as to total number of dairy cows "in all inclosures" is practically the same as already stated for cows on farms. The only ones having over 1,000,000 cows kept for milk are New York, Iowa, Illinois, and Wisconsin.

The total number of cows in a State does not, however, give as good an idea of the prominence of dairy interest as the density of the cow population (so to speak) and its relation to the number of inhabitants. New York stands first in this respect also, having 32.30 cows per square mile of land area, and in this State are three counties where the cows considerably exceed the people in number: Delaware County has 76,384 dairy cows, or 1,646 per 1,000 inhabitants; Chenango County has 53,751 cows, or 1,470 per 1,000 inhabitants; and St. Lawrence County has 105,440 cows (the greatest number of any county in the Union), or 1,184 per 1,000 of its population. The comparatively small State of Vermont comes next in number of cows per square mile, with 30.28, and there are also three counties in this State—Addison, Franklin, and Orleans—having from 1,100 to 1,250 cows to every 1,000 inhabitants. Connecticut comes next with 27.35 cows per square mile; then Iowa with 26.67 cows per square mile, and the counties of Delaware, Jones, and Kossuth, with 24,000 to 26,000 cows each, being 1,100 to almost 1,400 per 1,000 inhabitants. Other States having more than 20 dairy cows per square mile are the following: Massachusetts, 24.81; Rhode Island, 23.77; Pennsylvania, 22.72; New Jersey, 22.30; Ohio, 21.32. Five other States have over 15 cows per square mile. In ten other counties of the Union the dairy cows exceed the population, six of these being in Wisconsin, two in Minnesota, and one each in Illinois and Ohio. McHenry County, Ill., exceeds all others in this particular, having 51,419 dairy cows, and the remarkable ratio of 1,728 cows to 1,000 inhabitants.

The enumeration of all cattle by classes of age, sex, and utility, as described, enabled an estimate to be made of the average longevity of cows. The census considers a little less than 7 years to be the life of dairy cows, approximately, in the North Atlantic States, giving not quite 5 years as the average period of profit. In the other geographic

divisions of the country these averages appear to be nearly one year less.

The Twelfth Census places the average value of the dairy cows in the United States in 1900 at \$29.68. This makes the total value \$537,624,750. The highest value per head, \$35.43, is assigned to the Western Division, and the lowest, or \$21.97, to the South Atlantic Division. But in this estimate the town cows are rated no higher than those on farms. This is believed to be an undervaluation for cows in that class, so that the average for the year 1900 can safely be placed at something over \$30 per head.

Although, for the reasons stated, close comparisons should not be made between the dairy statistics of the Twelfth Census and those preceding, it is convenient to do so, in a general way, in some instances. An increase of about 1,500,000 cows seems to have occurred in the United States during the last decade, and this increase appears to have been quite evenly distributed over the country. Gains have occurred in all the five divisions in which the States are grouped for census purposes, but none especially marked, although the greatest has been in the eleven States of the Western division. The next largest increase is in the North Atlantic division, where demand for the combined dairy products greatly exceeds local production. In every one of the nine North Atlantic States, excepting perhaps New Jersey, there are more cows kept for milk than ever before. The increase in Vermont is believed to have been 20 per cent.

Comparisons between the dairy products reported by the Twelfth Census and the Eleventh should also be made with large allowances, if at all. There can be no doubt, however, of the material improvement in the dairy quality of cows kept for milk, and consequently in proportional aggregate production. The Eleventh Census gave the average annual milk product per cow as 315.4 gallons, the Twelfth Census reports the product as 424 gallons. This very remarkable gain is apparent rather than real. The average yield of milk per cow in 1890 must have been considerably greater than reported (so many animals were counted as milch cows which actually contributed nothing to the milk supply), and it seems certain that the figures for 1900 are too high.

Whatever the latter error may be, it is doubtless distributed quite evenly, so that the average annual yield per cow as given in the agricultural returns of the last census for different parts of the country are comparable. These show the relative productiveness of the cows in different sections in a very striking manner. The average for the cows of the North Atlantic States is given as 523 gallons; for the North Central Division, 425 gallons; for the Western Division, 418 gallons; for the South Atlantic Division (nine States), 356 gallons, and for the South Central Division (eight States), 336 gallons. The highest

annual yield returned is from the 1,251 cows on the 169 "farms" in the District of Columbia, being 680 gallons per cow. The States showing the best returns per cow are the following: Maine, 574 gallons; Massachusetts, 572; Rhode Island, 546; Connecticut, 545; New Hampshire, 528; Vermont, 526; Ohio, 520; Pennsylvania, 516, and New York, 515. Among the big dairy States of the North Central Division, the average yield in Wisconsin is placed at 473 gallons; in Illinois, 454; in Minnesota, 403, and in Iowa, 376. One of the greatest contrasts in this particular is shown by two States having a nearly equal number of cows: Arkansas has 312,577 cows on farms, averaging 351 gallons of milk and returning a total farm value for its dairy products of \$6,912,459. California has 307,245 cows on farms, averaging 500 gallons of milk, and its total dairy products were valued at \$12,128,471, or nearly twice as much as the other State, although the latter had 5,332 more cows.

The figures in the last paragraph are taken from those showing the total milk produced on 4,514,210 farms, according to the tables of the Twelfth Census. The "town cows" are not taken into consideration here. Relatively, the rates of production appear to be very nearly correct, although some errors are evident. New York is unquestionably too low; it should rank with the New England States in milk yield per cow. The Ohio average can not actually be higher than that of Illinois and is probably lower. Minnesota should stand next to Wisconsin. The evidence is abundant in support of these changes, although it can not be given here. But nearly all these census averages of yield per cow for farm cows are believed to be somewhat too large. They are not sustained by the other dairy statistics of the census nor by the numerous disconnected pieces of evidence which are available for verifying or testing the census returns. Instead of 424 gallons, as shown by the census, it is believed to be much nearer the truth to place the average annual yield of milk at 3,600 pounds per cow, which is a little over 418 gallons. This seems an immaterial reduction, but it makes quite a difference in the aggregate production for the 17,000,000 cows on farms.

As already stated, the milk and derivative products of cows "not on farms," but "kept for milk," were not obtained and reported by the Twelfth Census. An estimate of this production must therefore be made, as it will not do to ignore so important a factor as 6 per cent or more of all milk produced in the country. Whether right or wrong, the annual average yield per cow as given by the last census will be accepted and used as the basis of computations until more satisfactory data are available. This is 424 gallons per cow for those on farms. The "town cows" may safely be estimated, upon this basis, as producing 475 gallons per head. This is probably as much below the truth as the yield assigned to farm cows is above it. A few

examples may be given: The cows reported above for the District of Columbia as having an annual yield of 680 gallons each were the herds owned by public institutions and by milk-supply dairies. They were all practically "town cows" for market milk, and the 558 cows in the District not on farms were doubtless of the same kind and equally good, producing 600 or 700 gallons of milk each per year. The county of Richmond, N. Y., is Staten Island, a suburb of the metropolis. This county is credited with 1,444 cows upon 212 "farms," producing an average of 604 gallons of milk per cow. There were in the county 526 other cows, undoubtedly of equal dairy merit. More than three-quarters of the milk product reported was sold. The cows of this county were thus practically all "town cows" for market milk, producing annually over 600 gallons per head. Suffolk County, Mass., is covered by the city of Boston. The census reports 887 cows on 93 "farms" within the county, producing milk at the rate of 510 gallons yearly per cow. There were 509 other dairy cows "not on farms" in this county. Substantially all the milk produced was sold. All were "town cows" for market milk, producing over 500 gallons per head per year. (The probability is that the average yield of these cows was actually more.) The city and county of San Francisco are practically one. There were 5,005 cows reported as "on farms" in the county (and city), producing milk reported at nearly 4,000,000 gallons; practically all of this was sold. There were 608 other dairy cows. The average production reported for all these "town cows" was almost 800 gallons per year, while the average for the entire State is given as 500 gallons.

Other examples might be given to show that the dairy cows "not on farms" were in all cases much larger producers than those on farms, and were very generally not only "kept for milk," but for milk to be sold. Butter may have been made from some of them; in the main, however, their milk was used or sold, constituting a very large share of the total supply of market milk. It would be quite conservative to credit this important class of dairy cows with 500 gallons each per annum, but, as an offset to the probable excessive rate of 424 gallons per cow on farms, the rate of 475 will be estimated for cows not on farms and used for all subsequent computations in these pages.

The safest way to avoid duplication and conflict in considering the total annual dairy production of the country is to estimate the number of cows and the yield of milk necessary for the different products. The following arrangement answers that purpose for the year 1900:

	Cows.
For butter, at 154 pounds per year per cow	9, 700, 000
For cheese, at 368 pounds per year per cow	800, 000
For condensed milk, at 912 pounds per year per cow	200, 000
For milk consumed, at 430 gallons per year per cow	7, 412, 707
Total number of cows	18, 112, 707

This arbitrary arrangement of cows to the different branches of dairy production is based upon the published summaries of the Twelfth Census. Yet a smaller number of cows are thus assigned to butter and cheese production than was done ten years earlier, when these products were also much less. It might be more accurate to assume a lower rate of butter and cheese product and increase the number of "butter cows" and "cheese cows;" the number remaining for milk consumed would then be less, as it doubtless should be.

THE AGGREGATE MILK PRODUCTION AND ITS DISPOSITION IN THE UNITED STATES.

The agricultural tables of the Twelfth Census give the total quantity of milk produced on farms in this country, during the year 1899, as 7,266,392,674 gallons, or, in round numbers, 62,500,000,000 pounds. This was the product of 17,139,674 cows, reported from 4,514,210 farms, or an average of 424 gallons (3,650 pounds) per year per cow. As already noted, this statement of the milk product is believed to be too large. But these are the figures which will be generally quoted and referred to for some years to come, so that they may as well be considered as they stand. Of the total quantity, 49.7 per cent, or nearly one-half, was reported from the North Central Division and 25.1 per cent, or half the remainder, from the North Atlantic States.

To the product of the farm cows must be added that of nearly 1,000,000 town cows. Estimated as heretofore and for the reasons stated, as 475 gallons (or about 4,000 pounds) per cow, the annual product of this class of cows will be 462,190,675 gallons, or 3,900,000,000 pounds, which is more than one-sixteenth of the gross yield of the farm cows. There is no basis for determining the uses to which this great quantity of milk was applied. Most of it was doubtless consumed in its natural state. The total being regarded as market milk, there was enough to supply three or four times as many persons, at the average rate, as were included in the families of the owners of these cows not on farms. An indefinite portion of this milk must have been contributed, however, to the materials reported as received by the butter, cheese, and condensed-milk factories, and applied to making butter for the home use of the cow owners.

Altogether the milk produced in the United States during the year 1899 is thus placed at 7,728,583,349 gallons, or rather more than 66,000,000,000 pounds, being an annual supply of 101.3 gallons for every man, woman, and child in the country.

Accepting this great aggregate as possible, if not probable, the interesting question arises, How was all of this cows' milk used or disposed of? The census statistics furnish no satisfactory answer; the data obtained is interesting and suggestive, but it is plainly neither accurate nor complete. Effort was made to obtain information as to

the disposition of milk on farms. The butter and cheese made thereon was reported and also the milk and cream sold. The gross sales of milk were returned as 2,134,915,342 gallons, and of cream 20,768,662 gallons, being equivalent to 114,227,641 gallons of additional milk. A table is presented in the agricultural volume of the census (Table CLXVII, Vol. V, p. clxxvi) which is intended to show how the milk produced on farms was utilized. Besides the portion above stated as sold, estimates are given of the quantity converted into butter and cheese, and a conclusion reached as to the milk consumed on farms in ways unreported. In doing this, however, allowances were made at least 10 per cent too great for the milk made into cheese and 25 per cent too great, for milk made into butter.^a By correcting these manifest overestimates of the application of milk to butter and cheese made on farms, it is found that, instead of 1,244,857,710 gallons of milk consumed on farms, or 276 gallons per year for every farm reporting, the milk product of farms left unaccounted for is 1,402,644,302 gallons, or 12,062,740,994 pounds, being 310.7 gallons (or 2,672 pounds) annually per farm.

When, in addition to this, the enormous farm supplies of skim milk and buttermilk are considered, it is evident that some disposition other than consumption by human beings must be accepted as an explanation. One of three things must be true: The total milk product of cows on farms must have been considerably less, or the quantity of milk and cream sold from farms must have been much greater than reported, or some other use must have been made on farms of a large share of the milk produced. The sales of milk and cream are probably the most accurate of the farm dairy statistics. In many cases these facts are matters of record. Next in reliability are the sales of butter and cheese from farms; less reliable are the totals of these articles made on farms. Most doubtful of all is the annual milk product, especially when measured in gallons and estimated in June, 1900, for the twelve months ended with the December previous. But still, accepting these returns, a rational disposition must be sought for much of the milk reported produced. The census barely suggests an explanation by a single sentence: "In many reports, particularly from the North Central States, mention was made of the fact that some milk reported was fed to calves raised for veal." Before this sentence was written the writer proposed, in a paper published on this subject, to assign a definite and considerable portion of all milk reported produced on farms to the

^aThe census estimates 3.5 gallons of milk, or a little over 30 pounds, per pound of butter, and 1.3 gallons, or over 11 pounds of milk, for a pound of cheese. The corresponding estimates of the Dairy Division are 24 pounds milk per 1 pound butter and 10 pounds milk per 1 pound cheese. The two offices nearly agree in the equivalents of milk and cream, the one reckoning 5.5 gallons of milk as 1 gallon of cream and the other 5.5 pounds of milk as 1 pound of cream.

rearing of calves. In June, 1900, there were reported living nearly 53 calves under 1 year old for every 100 cows of all kinds over 2 years old. This was after a greater part of the veal calves of the year had been slaughtered. It is believed that 15,000,000 calves may be assumed to have been born and carried to an average age of at least six weeks from the 17,139,674 dairy cows on farms. This is, of course, an assumption, and must include calves fed for veal, mainly on whole milk, and calves raised for breeding and for beef, with more or less milk or none at all. It is now proposed to allow for these calves an average of 1 gallon of milk a day for about six weeks. This is purely an estimate, and will be by many regarded as excessive. It may be so, but it is more reasonable to thus dispose of the farm surplus of milk, which must be accounted for, than to count it as human food; and these are the only alternatives. Therefore the following table has been constructed to show the probable disposition of milk reported produced on farms, provided the census returns are correct. The total milk product, the sales of milk and cream, and the quantities of butter and cheese made on farms are from census tables.

TABLE II.—*Milk apparently available on farms and used or disposed of in 1899.*

Products and applications of milk.	Milk required.	
	Gallons.	Pounds.
Cheese made (16,372,330 pounds) <i>a</i>	19, 037, 593	163, 723, 300
Butter made (1,071,745,127 pounds) <i>b</i>	2, 990, 916, 633	25, 721, 883, 048
Cream sold (20,768,662 gallons) <i>c</i>	114, 227, 641	982, 357, 713
Milk sold (2,134,915,342 gallons) <i>d</i>	2, 134, 915, 342	18, 360, 271, 941
Total milk used or sold as above	5, 259, 097, 209	45, 228, 236, 002
Total milk reported produced on farms	7, 266, 392, 674	62, 490, 976, 996
Difference remaining available on farms.	2, 007, 295, 465	17, 262, 740, 994
Estimate consumed by 15,000,000 calves	604, 651, 163	5, 200, 000, 000
Remainder milk available for human food	1, 402, 644, 302	12, 062, 740, 994

a 1 pound cheese = 10 pounds of milk.
b 1 pound butter = 24 pounds of milk.

c 1 gallon cream = 47.3 pounds or 5.5 gallons milk.
d 1 gallon milk = 8.6 pounds.

Assuming that there are 6 persons to 1 farm—4,514,210 farms to provide for = 27,085,260 persons. (12,062,740,994 pounds milk ÷ 27,085,260 persons = 445.36 pounds milk per capita per annum; 445.36 pounds milk per annum gives 1.22 pounds of milk per capita per diem on these farms.)

Notwithstanding the arbitrary assignment of about 8 per cent of the total farm milk product as used by calves, there remains a supply of milk equal to 310.7 gallons, or 2,672 pounds per annum per farm reporting, for use by persons living on the same farms. Allowing 6 persons per farm, the annual supply becomes 445.36 pounds of milk per capita, or 1.22 pounds per day. If this were true, the people on farms would consume new or whole milk at a rate double that which

would be available for those not living on farms, besides the farm supplies of skim milk and buttermilk. The improbability of any such rate of farm consumption again forces the conclusion that the farm sales of milk and cream were greater than reported and the total milk produced on farms was much less.

In further illustration of the relations of the production of milk on farms to its disposition another table is presented, containing extracts from the census returns, except that cream is expressed in equivalent gallons of milk, the States being arranged in the order of greatest milk production.

TABLE III—*Production of milk on farms and its disposition, in part, in the United States and in selected States for 1899. (From the census.)*

State.	Total milk produced on farms.	Total milk (and cream) sold from farms.	Milk (and cream) pur- chased by factories. ^a
	<i>Gallons.</i>	<i>Gallons.</i>	<i>Gallons.</i>
United States.....	7,266,392,674	2,249,142,983	1,510,502,090
New York.....	772,799,352	448,782,151	273,392,236
Iowa.....	535,872,240	232,615,344	217,193,098
Pennsylvania.....	487,033,818	174,001,607	111,577,740
Wisconsin.....	472,274,264	261,462,356	250,334,660
Illinois.....	457,106,995	189,632,261	125,014,634
Ohio.....	425,870,394	86,903,989	47,942,648
Massachusetts.....	105,571,873	80,917,357	13,734,648
New Jersey.....	77,714,055	50,923,939	5,981,150

^a See Census, 1900, Vol. V, p. CLXXIX.

Notwithstanding the doubts expressed as to the statistics given above, they are regarded as having sufficient approximate and comparative accuracy to furnish certain marked and interesting features.

It is impossible to tell to what extent farm returns failed to include in the sales the milk and cream delivered to cooperative creameries and cheese factories, the butter and cheese from which were included in manufactures and not in farm products or sales. There is evidence that such errors of omission occurred. The milk and cream received at factories must have been greater than returned, because the manufactured products of those establishments required materials considerably more than the quantities reported. The business of most of these factories is a matter of record, and yet an examination of the original returns made by them for the census shows that records of products are more definite and reliable, in many cases, than those of the milk and cream received as materials for manufacture.

States like Iowa and Wisconsin, having the creamery and factory system well developed and no large demands for city milk supply, both report the milk received at the factories as within 20,000,000

gallons of the milk sales reported by farms. It appears that in Wisconsin the farm sales constituted more than half of the total milk produced. Explanatory of this is the fact that the farm products of butter and cheese in this State were comparatively small. More than half of all the milk went to the factories; no other such case is shown in the table. Ohio, on the contrary, with exceptionally large quantities of butter and cheese made on the farms (and comparatively few creameries), sent only 11 per cent of the milk to be manufactured elsewhere, and shows sales, outside the factories, twice as large as Iowa or Wisconsin. Illinois, New York, and Pennsylvania well show the local demands for city milk supply; a large share of the milk produced was sold from the farms, and yet, although creameries and cheese factories are numerous in these States, such establishments did not receive more than two-thirds of the milk reported as sold. The statistics of Massachusetts and New Jersey have been included as examples of the effects of dense population and local markets for milk; a very large part of the milk produced is sold from the farms, but very small portions of this go to creameries and cheese factories.

It is deemed unfortunate that the gallon was selected as the unit of milk measure for the farm returns of the census. Although it may be a familiar farm measure, records of milk are rarely if ever kept in gallons. Commercial transactions in milk, including the business between creameries and cheese factories and the farmers ("patrons") who supply them, are now generally conducted in pounds, although sometimes expressed in quarts. The gallon is itself an uncertain quantity, the milk gallon differing considerably in different States, but the pound avoirdupois is the same the country over. In the computations and conversions made for this discussion and its tables, a gallon of milk has been regarded as 8.6 pounds and a gallon of cream as 8.2 pounds.

BUTTER ON FARMS.

Whereas the census has heretofore reported, in connection with butter on farms, the single fact of quantity made, the Twelfth Census adds three important and interesting items—the number of farms reporting butter as a home product, the quantity sold from farms, and the value of such sales. It thus appears that 3,617,440 farms, or 63 per cent of the total number, reported butter, the total quantity made in the year 1899 being 1,071,745,127 pounds. Of the latter, 518,139,026 pounds, or rather more than one-half, was sold for \$86,606,446, or at an average rate of 16.7 cents per pound.

The following table is taken from the agricultural volume (Part I) of the census for 1900:

TABLE IV.—*Butter made on farms and sales of same. (Census of 1900.)*

Geographic divisions.	Farms reporting butter.	Pounds made.	Pounds sold.	Received from sales.	Average price obtained per pound (cents).
The United States.....	3, 617, 440	1, 071, 745, 127	518, 139, 026	\$86, 606, 446	16. 7
North Atlantic	427, 220	206, 284, 451	145, 773, 945	28, 346, 852	19. 4
South Atlantic	507, 857	89, 111, 226	24, 432, 566	4, 214, 943	17. 3
North Central	1, 599, 111	539, 104, 750	284, 995, 556	42, 695, 824	15. 0
South Central	960, 678	185, 923, 330	32, 246, 106	5, 231, 213	16. 2
Western	122, 500	51, 202, 299	30, 594, 594	6, 082, 141	19. 9
Alaska	3	200	50	18	36. 0
Hawaii.....	71	118, 871	96, 209	35, 455	36. 9

Over one-half, or 50.3 per cent, of the butter reported from farms was made in the North Central Division and 19.2 per cent in the North Atlantic. The former division sold 55 per cent of its farm butter and the latter division 28.2 per cent. This shows where the surplus farm, or "dairy," butter is made. The South Central Division sold only 6.2 per cent of its farm product; the South Atlantic Division only 4.7 per cent, and the Western Division only 5.9 per cent.

It may be supposed that the returns of butter made on farms were as accurate as reported for the censuses of previous years as for that of 1900. Comparisons are therefore in order. The total product on farms reported every ten years from 1859 to 1899, inclusive, is given in Table X, on page 49. The farm-butter product per capita of population has been as follows: Census of 1850, 13.51 pounds; census of 1860, 14.62 pounds; census of 1870, 13.33 pounds; census of 1880, 15.50 pounds; census of 1890, 16.33 pounds, and census of 1900, 14.06 pounds of farm butter per capita per annum. Since 1880, and including that year, creamery butter also has been produced in rapidly increasing quantity. Therefore the per capita production of farm butter has been quite variable, and, although the rate increased during the decade prior to 1890, notwithstanding a very large increase of creamery butter during the same period, the last decade shows a decrease in rate exceeding anything previous; while, at the same time, the total production of butter on farms, as reported by the Twelfth Census, was somewhat greater than ever before.

The five States producing the greatest quantity of butter on farms were, in the order named, Ohio, New York, Pennsylvania, Iowa, and Michigan. Together they produced almost one-third of the total.

In the discussion of the statistics of dairy products in the agricultural volume of the Twelfth Census, it is stated that, for reasons

already referred to, the butter reported as made on farms should probably be reduced by 7,400,000 pounds and the milk sales correspondingly increased. This correction is considered as belonging to the returns for the States of Vermont, Minnesota, Kansas, and Nebraska. Besides this, the census estimates that butter was made on farms and not reported to the amount of 50,000,000 pounds.

CHEESE ON FARMS.

The quantity of cheese made on farms has decreased steadily ever since the beginning of the factory system of manufacture in this country—about fifty years ago. The number of farms reporting cheese in 1900 was only 15,670, or one farm in every 366. Of these farms, approximately half were in the North Central Division and one-half of the remainder in the North Atlantic States. But the Western Division reported more cheese made on farms than any other geographical division, because the State of California was credited with 4,249,588 pounds, or over one-fourth of the total product on farms, which was 16,372,330 pounds. New York was next, with 2,624,552 pounds, and the States of Wisconsin and Ohio were the only others in which over 1,000,000 pounds were made during the census year, although Pennsylvania approached that quantity. But every State and Territory in the Union reported some cheese made on farms. Massachusetts, Rhode Island, Delaware, South Carolina, Georgia, Florida, Arkansas, and Indian Territory were the only ones reporting less than 20,000 pounds each. Cheese making on farms is therefore a widely diffused industry still, despite the preponderance of factory-made cheese.

More than seven-eighths of this home-made cheese was sold from the farms. The average price reported received for it was 9.1 cents per pound. In the North Atlantic and Western Divisions the averages were the same, 9.6 cents; this was the rate in New York, while in California it was but 9.1 cents. In Wisconsin the average was but 8.7 cents, and in Ohio 6.8 cents.

As compared with the Eleventh Census, the Twelfth shows a decrease in the whole country of nearly 2,500,000 pounds of farm-made cheese per year, or 12.6 per cent, although the total cheese product of the United States appears to have increased over 16 per cent.^a

^aSee modifying statement on p. 42.

FARM SALES OF DAIRY PRODUCTS.

Following is a general summary of the quantities and values of dairy products sold from 4,514,210 farms in the United States, and the totals of such products thereon, as reported by the census for 1900:

Milk sold, 2,134,915,342 gallons.....	\$184,842,292
Cream sold, 20,768,662 gallons.....	8,838,776
Butter sold, 518,139,026 pounds	86,606,446
Cheese sold, 14,692,542 pounds.....	1,342,444
Total value of dairy products sold from farms	281,629,958
Total value of such products consumed on farms....	190,739,297
Aggregate value of dairy products on farms, 1899 ..	472,369,255

The totals given include the small returns from Alaska and Hawaii. The average value of dairy products per farm reporting was \$104.64, and the average annual sales of such products per farm was only \$62.39. The census of 1900, in the discussion of these data, expresses the opinion that, by reason of errors and omissions, the totals above are considerably below the actual facts.

BUTTER, CHEESE, AND CONDENSED-MILK FACTORIES.

One of the most striking features in the history of dairy farming in the United States is the transfer of this productive industry, in large part, from the farm to the factory. The cows and milk continue to be farm property and products, but a constantly increasing share of the labor of converting milk into market form is done at creameries, cheese factories, and condenseries. This change has transpired during the last half century, which covers the period of development of associated and cooperative dairying in America. When the milk produced on two or more farms or the cream from such milk is brought together at one place to be condensed or made into cheese or butter, domestic industry ceases, the place becomes a factory, and its output a manufactured product.

Consequently, for census purposes, the statistics of the dairy industry in the United States are collected and compiled in two distinct parts, by different sets of employees, under separate supervision, and published in separate volumes. The products and sales of farms appear in the agricultural tables as one part and the materials and products of the dairy factories appear in the tables of manufactures as another part. The reasons for this are sound from the standpoint of the Director of the Census, but the result is unsatisfactory to those who wish to study and use the data. One serious objection to this plan is the entire separation of the statistics of raw materials produced and disposed of by farms from those of the dairy establishments preparing the market products. The two parts can only be adjusted and harmonized by violent methods.

The Seventh Census noted the existence of 8 cheese factories in 1850. The number increased very little until after 1860. In 1870, there were reported 1,313 cheese factories and butter factories, generally called creameries. The census for 1880 reported 3,932, and that for 1890 gave the number at 4,712. The latter was the number of establishments from which reports were rendered; it is well known, however, that a considerable number of such factories, probably 2,500, were then actually in operation from which no returns were obtained for the Eleventh Census. This fact should be borne in mind. Although the figures for different years are brought together in tables which follow, as a matter of record, direct comparisons will, in most cases, be very misleading.

The returns for 1900 include the statistics of 9,242 butter, cheese, and condensed-milk factories. These central plants have under their control 2,050 skimming, or separating, stations and 747 other branches. There are also 113 urban establishments reporting the manufacture of butter or cheese or both. These latter are, in a few cases, creameries located in cities and which escaped the regular enumerators, but in most instances they are milk-supply establishments which simply manufacture their variable surplus of milk and cream. Their products, amounting to several hundred thousand pounds of butter and cheese annually, can not be ignored, and these data are distributed to their respective States in some of the tables following. The total number of establishments in the country for 1900 is therefore 9,355, and the principal data concerning them will be found in the table below, which shows the distribution of the dairy factories of 1900, by States and Territories, and their classification according to products.

TABLE V.—*Cheese, butter, and condensed-milk factories: Number of establishments in each class, classified according to products, by States and Territories, 1900.*

States and Territories.	Total number of establishments.	Butter only produced.	Cheese only produced.	Condensed milk only produced.	Cream for sale the only product.	Two or more products reported.
United States.....	9,242	5,275	3,299	38	47	583
Alabama	4	3	1	.....	.....	.....
Arizona	7	1	1	.....	.....	5
Arkansas	8	7	.....	.....	.....	1
California	178	143	17	2	1	15
Colorado	38	20	9	.....	1	8
Connecticut	71	62	2	.....	.....	7
Delaware.....	22	21	1	.....	.....	.....
Georgia.....	4	4	.....	.....	.....	.....
Idaho.....	19	11	4	.....	.....	4
Illinois	527	393	51	6	5	72
Indiana	112	75	26	.....	.....	11
Iowa.....	907	816	81	.....	2	8

TABLE V.—*Cheese, butter, and condensed-milk factories, etc.*—Continued.

States and Territories.	Total number of establishments.	Butter only produced.	Cheese only produced.	Con-densed milk only produced.	Cream for sale the only product.	Two or more products reported.
Kansas	171	133	30	1	.....	7
Kentucky	9	7	1	.....	.....	1
Maine	61	44	16	1	.....	.....
Maryland	84	78	.....	.....	6	.....
Massachusetts	50	46	1	.....	1	2
Michigan	286	146	130	3	1	6
Minnesota	596	538	47	.....	3	8
Mississippi	2	2	.....	.....	.....	.....
Missouri	79	48	24	1	.....	6
Montana	3	3	.....	.....	.....	.....
Nebraska	93	82	5	.....	1	5
Nevada	4	2	.....	.....	.....	2
New Hampshire	53	47	4	1	1	.....
New Jersey	53	47	1	1	4	.....
New York	1,908	575	1,151	12	4	166
North Dakota	21	13	8	.....	.....	.....
Ohio	479	147	221	1	11	99
Oklahoma	5	2	3	.....	.....	.....
Oregon	68	39	16	.....	1	12
Pennsylvania	749	603	124	3	3	16
Rhode Island	3	3	.....	.....	.....	.....
South Dakota	138	122	14	.....	.....	2
Tennessee	12	11	1	.....	.....	.....
Texas	12	9	2	.....	.....	1
Utah	57	21	7	.....	.....	29
Vermont	255	180	61	2	2	10
Virginia	10	8	2	.....	.....	.....
Washington	60	33	8	1	.....	18
West Virginia	4	1	2	.....	.....	1
Wisconsin	2,018	728	1,227	3	.....	60
Wyoming	2	1	.....	.....	.....	1

THE ASSOCIATED SYSTEM OF DAIRYING.

The statement has been frequently made that the associated system of dairying originated in this country, and it has been called "The American system." Those who first associated themselves and brought milk together from different farms for making butter and cheese probably never heard of such methods elsewhere, and so were originators for their own time and neighborhoods. But the change was only a natural evolution in the industry here, and the same thing had been done long before in other lands. In the Jura Mountain region of France and Switzerland, cooperative cheese making has been systematically practiced for at least four centuries and probably much longer. In the United States, cooperation among dairymen was first applied in making cheese. This plan attracted attention and was recognized as successful in Oneida County, N. Y., about 1852. Very slowly the

cheese factory became an established institution. Once fairly started in the heart of the cheese-making district of New York, the factory system spread with much rapidity. The "war period," during which the price of cheese more than doubled, lent additional impetus to the movement. A like effect was produced from the increase in cheese exports which occurred about the same time. These exports rose from 13,020,817 pounds in 1850 to 15,515,799 in 1860, and to 53,154,318 in 1865; ten years later 101,010,853 pounds of cheese were exported. The early growth of this factory system is shown in the following table:

TABLE VI.—*Number of cheese factories established in the State of New York annually, 1854-1866.*

Years.	Facto- ries.	Years.	Facto- ries.	Years.	Facto- ries.
1854.....	4	1860.....	17	1866.....	46
1855.....	2	1861.....	18	Total number in operation in 1866.	499
1856.....	3	1862.....	25		
1857.....	3	1863.....	111		
1858.....	4	1864.....	210		
1859.....	4	1865.....	52		

Cheese factories were started in Pennsylvania and Ohio soon after they became popular in New York, and then they appeared in other States both East and West.

Making butter in quantity from milk or cream collected from numerous farms soon followed the introduction of cheese factories. Such establishments are properly butter factories, but the name "creamery" has been generally adopted and is not likely to be changed. So far as known, the creamery system of butter making originated in the United States. The first creamery was built in Orange County, N. Y., in the year 1864, and received daily the milk from 375 cows. In Illinois the first cheese factory was started in 1863 and the first creamery in 1867. In Iowa these respective events were in 1866 and 1871.

The early cheese factories and creameries were purely cooperative concerns, and it is in this form that the system has usually extended into new territory, whether for the production of butter or cheese. There are, however, various other forms of ownership and management, involving the cooperative principle in part or being purely proprietary.

It was impossible to separate these establishments in classes according to all the modifications of ownership and management for the Twelfth Census, but four groups were made: Individual, 4,507; firm, 1,335; corporation, 1,591; cooperative, 1,813; total, 9,246. It thus appears that the proprietary plan or private ownership is now greatly

in excess of the cooperative system. The tendency has been toward changes in this direction for a number of years. In New England less than twenty years ago all the creameries were cooperative; now a bare majority so remain in Maine, New Hampshire, and Massachusetts. In Iowa, where the cooperative plan formerly prevailed, less than one-third still remain of that form. Minnesota creameries were for years almost all cooperative; about 60 per cent continue to be so. As examples of the other extreme, only 8 factories are cooperative out of 178 in California, only 13 out of 171 in Kansas, and only 372 out of 2,018 in Wisconsin.

Although establishments of this kind are usually successful, there is misjudgment and failure as in other lines of industry. Many have been started by "promoters," injudiciously located, or overcapitalized, and closed after brief careers. Fires, consolidations, and other changes of ownership add to the causes for frequent changes. Of the 9,246 establishments enumerated in 1900, 5,463, or over one-half, were reported as established within the preceding decade, and 439 as started during the census year.

During the earlier years of their operation it was not uncommon for both butter and cheese to be made in these factories at different seasons, or butter and skim cheese at the same time. A more distinct separation has resulted from a healthy sentiment (aided by State laws) to make full-cream cheese, and from a preference on the part of creameries to have no cheese making about the premises. The totals from Table V, on page 28, according to their products, are as follows:

Number making butter only	5,275
Number making cheese only	3,299
Number making condensed milk only	38
Number selling cream	47
Number reporting two or more products	583

Of the last group, there are 571 which make both butter and cheese, 11 which make butter and condensed milk, and 1 which makes cheese and condensed milk. In order to make desirable averages and comparisons, and at the same time avoid duplications, a rearrangement is necessary, by which the combined establishments are arbitrarily but equitably distributed. This being done, the following classification is obtained for the whole country:

Creameries	5,567
Condenseries	43
Cheese factories	3,585
Cream shippers	47
Total	9,242

No factory is counted twice in this arrangement. Recognizing the dual character of some establishments, it is found that there are altogether 5,857 where butter is made and 3,872 where cheese is made.

Under this classification without duplication, Iowa has the greatest number of creameries, 820, and Wisconsin next, 759; then New York 659, Pennsylvania 611, Minnesota 542, and Illinois 430. No other State has as many as 200. As to cheese factories, the States having the greatest number are: Wisconsin 1,256, New York, 1,231, Ohio 271, Michigan 132, and Pennsylvania 132. No other State has more than 90.

By the census of 1890, the three States which reported the greatest number of creameries and cheese factories together were New York 1,337, Wisconsin 966, and Iowa 500. The same States stand at the head in 1900, but Wisconsin and New York change places; these two States divide their establishments similarly, there being in each somewhat more than half as many creameries as cheese factories. Iowa, holding third place, is preeminently a butter-making State, with more creameries than any other, but only 85 cheese factories. During the last twenty years creameries have increased in number much faster than cheese factories, and the system has extended into new territory, especially in the North Central and Western States. A comparatively new plan is the organization of large companies which establish a central manufacturing plant, and transport to this the raw material in the form of cream or milk, usually the former. This is collected from branches known as shipping stations and skimming stations, at which deliveries are made by the farmers of the neighborhood. Cream is thus gathered and carried long distances by rail to the main creamery.

The extent of associated dairying in some States, especially Kansas and Nebraska, would not be understood from Table V without explanations. Although reporting only 171 and 93 factories, respectively, of all kinds, in 1900, there were in addition 307 and 284 shipping stations, or separating and skimming stations, in these two States. Many of these were formerly independent creameries or cheese factories which have been absorbed by the large companies, and thus ceased to be manufacturing plants. The returns show that in 1900 there were 473 centrifugal cream separators in operation in these creameries and their branches in Kansas, and 324 separators in Nebraska factories and branches. Vermont is another example of a largely increased factory production, apparently out of proportion to the number of new establishments. Consolidation and large companies with branches explain the facts there also. Vermont reported 184 skimming stations in operation in 1900, and 382 power separators in use by the creameries of that State and their stations or branches.

AVERAGE PRODUCT OF FACTORIES.

There is much difference in the size of the factories in the several States. In New York and Pennsylvania the creameries are small, the average annual product being, respectively, 57,000 and 59,000 pounds of butter. In Illinois and Minnesota the average is 72,000 and 75,000

pounds, respectively, and in Wisconsin 91,000 pounds. In Iowa they are larger, with an annual output of 104,000 pounds. Vermont and Kansas show the influence of a few large establishments by raising the average to 121,000 and 133,000 pounds, respectively. Some of the large creameries make from 2,000,000 to 4,000,000 pounds of butter a year. For the entire country the average product of a creamery for a year is 71,730 pounds of butter. Similar differences exist among the cheese factories; the largest are in New York, where the average product is 97,000 pounds a year, and in Wisconsin, where there are many small factories, the average is brought down to 61,000 pounds. In Michigan and Pennsylvania the average is 75,000 or 76,000 pounds. The annual product of the average cheese factory for the whole country is a little larger than for the average creamery, or nearly 73,000 pounds. A few report the production of 500,000 to 1,500,000 pounds a year. (The round numbers given are approximately correct, due allowance being made for some factories which can not properly be included.) It must be remembered, however, that this represents only 730,000 pounds of milk used by the average cheese factory in a year, while the average creamery requires over 1,500,000 pounds of milk for its annual product of butter. This does not indicate that twice as many cows are necessary to support a creamery as for a cheese factory, because, as a rule, the latter is in operation only during the pasturage season, or about half the year, while in most cases the creamery makes butter the entire year. In fact, the average creamery represents, while in operation, the milk from 450 cows, and the average cheese factory 300 or more cows. In the aggregate, the creameries of the United States appear to use all the milk from about 2,600,000 cows throughout the year, or an average of 160 pounds of butter per cow, and the cheese factories use the milk from 1,130,000 cows for half the year, representing an average product of 250 pounds of cheese in six months.

CREAMERIES AND THEIR PRODUCTS.

The creamery system was introduced east of the Hudson River but little more than twenty years ago, upon what was known as the "cream-gathering" plan. This was a popular form of creamery management in some Western States and in parts of the Middle States from 1876 or 1878 until after 1890. Under this plan the cream was separated by gravity (or "setting") on the producing farms, skimmed there, and the cream only went to the creamery, being usually collected daily by agents, or gatherers, from the factory, whence the name. The dairy centrifuge, or cream separator, made its appearance in America in the year 1879, and has revolutionized dairy and creamery management. The popularity of this machine for mechanical skimming or separation of cream dates from about 1885, and since

that time "the separator plan" has been adopted by practically all new factories and has rapidly replaced the cream-gathering plan in established creameries. The separator, operated by power, has been placed at the creamery and at its branches or separating stations; the milk for butter has been hauled daily to these places to be there creamed or separated. This radical change of management accounts for the decrease in cream as a "material" received by the creameries, and partly for the increased quantity of milk so received.

That cream-gathering creameries have not ceased to exist is evident from the quantity of cream still included in the creamery receipts of "material." There were 203,673,958 pounds reported for 1900; of this, 63,308,657 pounds (7,720,568 gallons) were sold by the creameries, leaving 140,365,301 pounds, or enough to make 40,000,000 pounds of butter, being almost 10 per cent of the entire creamery output. Iowa is a good example, although not a strong cream-gathering State. It is known that 10 per cent of all creameries in Iowa are conducted on the gathered-cream plan, and 7 per cent in addition combine this plan with that of receiving whole milk to be separated at the creamery.

CREAMERY MATERIALS AND EQUIPMENT.

The large quantity of cream still appearing as raw material at the creameries is indicative of another change in system and suggestive of another great dairy invention. The centrifugal cream separator was introduced and generally adopted in large sizes, requiring steam power, and of such capacity that one machine, operated a few hours every morning, could cream the milk from several hundred cows. One powerful separator is therefore the usual equipment of a creamery and does the work for a whole neighborhood. It has been found that the labor and expenses of daily hauling the entire milk product of patrons' farms to the creamery, often several miles distant, is too great a tax upon the industry. A movement toward relief to the patrons, and economy to creamery management, has been the establishment of neighborhood "skimming stations," equipped only with separator and power to operate it, as branches of the central plant. From these stations the cream is transported to the parent butter-making factory. These centrifugal separators in use by creameries were first enumerated for the present census; also, for the first time, the branch factories or separating, or skimming stations. There were returned 9,701 separators, and 2,719 branch stations of all kinds. While cheese factories sometimes have branches of the parent establishment, they do not have separating, or skimming stations; all the latter class of subsidiary establishments may therefore be taken as belonging to creameries, and a part of the other branch factories. Hence, if to the 5,571 creameries there be added 2,050 skimming stations and 69 other

branches, 7,690 establishments are found having use for separators. Over 2,000 creameries, therefore, use two or more separators. The exact number still operated without the centrifuge, or upon the old cream-gathering plan, remains undetermined.

The new elements influencing modification in the creamery system are the invention of what is known as the Babcock fat test for milk and the adoption of the farm separator in sizes for either hand or power. Milk delivered at creameries and cheese factories is now generally tested and paid for on the basis of its fat content or butter-making value. Farm and creamery methods are so much simplified by these improvements that many dairy farmers are procuring private separators. The State dairy commissioner of Iowa reports 904 farm separators owned by patrons of creameries in 1898, 1,762 in 1899, 3,332 in 1900, 5,231 in 1901, 8,323 in 1902, and 16,800 in 1903. This new form of the "cream-gathering plan" is rapidly extending; cream again forms a large share of the raw material received at the factories for butter making, and the next census will probably show, instead of a decrease, a very considerable increase in this item.

CREAMERY PRODUCTS.

The quantity of butter made at creameries has been reported under two heads—"packed solid" and "prints or rolls." It appears that of all creamery butter, 328,956,590 pounds, or 78.3 per cent, is packed in solid form, and 91,169,956 pounds, or 21.7 per cent, as prints or rolls. The totals of these two forms in the several States indicate differences in the market requirements and the local customs as to preparing butter for shipment and sale. In the New England States, the numerous cities and large towns, easy of access, furnish markets where butter can be sold directly to retail dealers and largely to consumers; for this purpose it is prepared in lumps, bricks, or prints, weighing a half pound or a pound. Vermont excepted, the creameries of these States make twice as much butter into prints as they pack in solid form. In Rhode Island and Connecticut, with consuming markets at their doors, 8 pounds of creamery butter are put into prints to every pound packed. In Vermont, on the contrary, with little local demand and the necessity of shipping to market, about one-fourth of the creamery butter is made into prints. New York has always been in the habit of packing butter solidly in firkins, tubs, or boxes, and print butter is rather exceptional in the great market of New York City; in this State, therefore, $4\frac{1}{2}$ pounds of butter are packed to 1 pound put in prints. The Philadelphia market, on the contrary, and Pennsylvania markets in general, have always been noted for print butter; consequently it is not surprising to find that the creameries of this State report almost twice as much made into prints as the quantity solid packed. From Iowa, Wisconsin, and

Minnesota, butter must be sent long distances to market, and naturally goes mainly in bulk; less than one-eighteenth of the creamery product in these States is made into prints. South Dakota, even more remote from market, packs 90 per cent of its creamery butter in solid form. But upon the Pacific coast, local custom favors butter in rolls of 2 pounds weight; accordingly, in the States of California, Oregon, and Washington three-fourths of all the butter made at creameries is reported to be in prints or rolls.

BUTTER PRICES.

Creameries which are able to market butter in the form of prints or rolls generally derive a benefit therefrom. Although extra labor is required to prepare butter in this way, and packages and transportation for it cost rather more, it is a retail form, attractive, brings a higher price, and can be sold more directly to the consumer, saving the commissions of the middlemen. The average price obtained for all butter, as reported by the creameries for the census year, was very nearly 20.1 cents per pound. The average for that solid packed, for the whole country, was 19.4 cents, and for the prints or rolls 22.1 cents. The advantage of nearby markets is shown by these average prices for print butter: Connecticut, 24.6 cents per pound; Massachusetts, 23.5 cents; and Pennsylvania, 23.4 cents. For California creamery rolls the average is 22.3 cents. Contrasted with these is the average price for the packed, or tub, butter of Iowa, Minnesota, and Wisconsin creameries, 19 cents; 18 cents for Nebraska, and 17 for Kansas.

RICHNESS OF MILK, OR BUTTER RATIO.

Assuming the substantial accuracy of the returns from creameries of milk and cream received for making butter, and of the butter made from it, interesting computations can be made of the ratio of milk to butter in the country at large and the several States. The results illustrate the difference in the average richness of milk in different States. The nearest quarter-pound obtained in each calculation is taken as quite accurate enough for purposes of comparison. It is thus found that creameries of the United States require on the average $22\frac{1}{2}$ pounds of milk, or its equivalent in cream, to make 1 pound of merchantable butter. New York appears to have the richest milk of any of the leading dairy States, its creameries making 1 pound of butter from every 21 pounds of milk received. New Hampshire stands second, with a ratio of $21\frac{1}{4}$ to 1; and California third, $21\frac{1}{2}$ to 1. Minnesota, Pennsylvania, and Wisconsin are alike, showing 22 pounds as the average; then Illinois $22\frac{1}{4}$, Kansas and Vermont $23\frac{1}{4}$, and Iowa 24 pounds. These ten States suffice for illustration. The results can not be accepted as absolutely accurate; it is probable that the average

pounds of milk stated for the country at large, and for most of the States named, is somewhat below the truth. For the United States the ratio stated would indicate all milk contributed to creameries to have an average of 3.81 per cent of butter fat. For New York the average would have to be 4.08 per cent fat. It is not likely that the average richness of milk is so great as this. Nor is it probable that there is so great a difference between New Hampshire (and New York) and Vermont in this respect. The comparison between Minnesota and Wisconsin, Illinois and Iowa, is believed to be correct; Wisconsin has large holdings of "special purpose cows" which give rich milk, and the same is true of Minnesota to a considerable degree; while in Iowa the "general purpose cow" is popular, giving less milk and poorer in butter quality.

If, instead of the above, 2½ pounds of milk is assumed as the required average for the whole country to make a pound of creamery butter, this would necessitate milk with an average of 3.7267 per cent of butter fat. No State has dared to fix a legal standard so high as this for milk produced within its borders, and only one has a standard above 3.5 per cent.

CREAM SALES.

The returns of creamery products give evidence that the sale of cream has become a large and profitable branch of the business in some States. The creameries of New York, Illinois, Ohio, and Pennsylvania made sales of cream, respectively, as follows: 1,492,926 gallons at 53 cents, 1,190,125 gallons at 56 cents, 787,331 gallons at 50 cents, and 686,316 gallons at 58 cents. A different and notable case is that of the State of Maine; its creameries sold 755,845 gallons of cream at 71 cents a gallon, or \$534,295, and this was considered more than half as much as the total butter sales of the State. No other State sold as much as 500,000 gallons. The quantity of cream reported as sold by all the creameries of the country was 7,720,569 gallons, valued at \$4,435,444, or 57 cents per gallon; the profit of this branch of the business is seen by the fact that, at the average creamery receipts for butter, this quantity of cream, if made into butter, would have realized only \$3,438,754. Ordinarily the gallon of cream thus sold would be the equivalent of a fraction less than 2 pounds of butter.

SKIM MILK.

Of this by-product of the creameries the great amount of 2,253,494,156 pounds is reported as "sold, fed, or returned to patrons." The total value is given at \$2,531,460, or 11.23 cents per 100 pounds. Skim milk is actually worth twice as much as this to farmers who use it judiciously as food for young stock. But commercially it is worth less, or about 10 cents per 100 pounds; this is the usual price allowed to patrons who sell it to the creameries for conversion into casein.

DRIED CASEIN.

A comparatively new branch of the dairy industry, which has acquired importance enough to be observed, is the production of commercial casein from the skim milk of creameries. Milk from which all the fat has been extracted by the separator is coagulated by acid, the whey drawn off, the acid washed from the curd, or casein, then dried. The desiccated product has a commercial value of 3 to 5 cents per pound at the creameries where made, depending largely upon subsequent cost of transportation, and is used for making a glue good for paper sizing, as a binder for cheap paint, a "filler" for dressing wood and heavy fabrics, and for various other purposes. The statistics of creamery products show 12,298,405 pounds of this material made during the census year, having a value, at the creameries, of \$383,581, or only a little more than 3 cents a pound. The State of New York produced more than half the total quantity, and Pennsylvania and Illinois are the only others in which over 1,000,000 pounds were made.

CHEESE FACTORIES AND THEIR PRODUCTS.

The management of the cheese factory is in some respects similar to that of the creamery. Patrons deliver at the factory daily the whole milk while still sweet and sound, and it is made into cheese without delay. Cheese is usually the only commercial product of the factory, and the only waste product is whey. The latter may be returned to patrons, or fed to hogs at the factory, or sold to be used as the material for making sugar of milk. For a score of years or more after these factories became numerous, the cheese from them, although different in form, size, color, and quality, was nearly all made upon the same general plan, closely resembling that of the English Cheddar. Hence a certain uniformity of type was established which became known as the "standard American" or "full-cream factory" cheese, also often called Cheddar. During the last ten or twenty years, however, a much greater variety has entered into the factory cheese; this is chiefly the result of imitating certain popular foreign kinds. The recent census has, for the first time, attempted to classify the factory product. It appears that the 3,585 cheese factories of the United States report a total production of 281,972,324 pounds of cheese during the census year (as against 238,035,065 pounds reported in 1890), and that 225,776,105 pounds was of the American standard factory kind, and 56,196,219 pounds, or 20 per cent, of the several other varieties.

The great cheese factory States are the same as at the time of the Eleventh Census, as has been already noted. In New York, 89.2 per cent of the product is of the standard, full-cream, Cheddar-made variety, and this kind preponderates in Ohio, Michigan, and Pennsylvania; these are the oldest cheese-making States. In Wisconsin the 77,748,680 pounds is divided as follows: American standard, 62.1 per

cent, and the other kinds, 37.9 per cent. In Illinois, however, the standard is exceeded in quantity by the others—4,324,461 pounds of the former to 4,730,658 pounds of the latter. These “other kinds” comprise various well-known foreign varieties, those made in large quantity being mainly the Swiss Gruyère, or Emmenthaler, and the Limburger; there are also some resembling one or both of these, especially the “Brick” cheese. The Neufchâtel and cream cheese, the Brie and Camembert, are also made in considerable quantities. The value of cheese at the factory is reported as averaging nearly 9.5 cents a pound, being a little more for the standard variety than the average for all other kinds.

WHEY.

The quantity of whey reported as the waste product of cheese factories is 209,067,667 pounds, but this had a value of only \$204,277; it appears that of this only 21.3 per cent was sold and the rest “used” or returned to the patrons. As milk sugar is the sole commercial product for which whey is utilized in this country, it is probable that all reported sold was for that purpose. The quantity of sugar of milk manufactured was not ascertained; there are only three or four places in the United States where this article is made, and yet it is produced here in greater quantity than anywhere else in the world.

MILK CONDENSERIES AND THEIR PRODUCTS.

The condensed-milk industry was started about the same time as the factory system for making butter and cheese. Some method had long been sought for preserving milk, but none was successful until the invention of Gail Borden. After ten years of experimenting, he decided that a semiliquid state was the best form of preservation, and in 1856 settled upon the process which has since popularized the product in every quarter of the globe. The present extensive industry in Europe as well as in America, with its numerous different establishments and many commercial names, or brands, is based upon Mr. Borden's methods. This applies to the unsweetened article as well as that preserved with sugar, for “plain condensed milk” was first introduced and put upon the market about the year 1861. It was then mainly in open vessels and intended for early use. Between 1860 and 1870; milk in both forms had become well known, and four or five factories were in operation, each producing about five thousand 1-pound cans per day.

Prior to the Twelfth Census, the statistics of this industry were few: In 1880, the total annual product was reported as 13,033,267 pounds, valued at \$1,547,588, and ten years later the same items were 37,926,821 pounds, valued at \$3,586,927. For 1890, the total materials reported as used cost \$2,792,086, and included 83,617,655 pounds of

milk and 13,372,365 pounds of sugar. There is little doubt that these figures were considerably below the actual facts.

It now appears that in the year 1900 there were 50 establishments for condensing milk, operating in 14 different States, with a business shown by the following aggregates:

Milk bought (421, 378, 073 pounds)	\$4, 662, 437
Sugar bought (50, 873, 859 pounds).....	2, 589, 687
Cans, labels, etc	1, 654, 897
Materials used, aggregate cost	<u>8, 907, 021</u>
Condensed milk (186, 921, 787 pounds).....	11, 888, 792
Other and incidental products.....	<u>33, 680</u>
Products, aggregate value	11, 922, 472

The two States of New York and Illinois contain more than half of the condenseries reported, and produce over three-fourths of the entire output. Eleven States each produced over 1,000,000 pounds of condensed milk during the census year. Arranged in the order of greatest product, they were these (the figures following the names indicate the number of condenseries from which statistics were obtained; the number of these establishments, with the position of the State in this list, give a fair idea of the relative size and importance of the condenseries): New York (16), Illinois (11), Michigan (4), California (2), Wisconsin (4), Pennsylvania (3), New Hampshire (1), Maine (1), Vermont (2), Washington (1), and New Jersey (1). The total product in New York was 75,447,148 pounds, followed closely by Illinois, with 71,257,449. As the latter State has only 11 factories, while the former has 16, the size of those in Illinois must be relatively larger. Michigan made 18,378,869 pounds of condensed milk, but no other State in the above list made as much as 5,000,000 pounds. Missouri, Indiana, Kansas, and Ohio, with one condensery each, produced from 380,500 to 100,000 pounds.

Of the 50 establishments reported, 38 had condensed milk as their only product; 11 made butter also. The latter class is highly suggestive of a skimmed or partly skimmed article of milk being condensed. Five of these factories are in Illinois and 3 in New York. One factory in New York made both cheese and condensed milk, and one in Illinois made both of these articles and butter also.

There are several interesting items in the statistics of this industry. Although a considerable but unknown part of the product is the plain or unsweetened article, the sugar used for the remainder costs more than half as much as all of the milk condensed and preserved. The materials have a total value of \$8,907,021, and that of the finished product is \$11,922,472 for the whole country. But the cost of manufacture includes, besides the materials, the use and wear and tear of the factories, with their expensive machinery and general equipment,

and the wages of many skilled employees. The value of the condensed milk at the factories appears to average a little over 6½ cents per pound in cans. There is a variation between 6 and 7 cents in different States, which is easily accounted for. In some the proportion of unsweetened milk is much greater and the cost and value correspondingly less. The quality of milk and of condensed product is very much better in some cases than in others, and the consequent cost and value are more. Under the general designation of "condensed milk" are included all the preparations of milk from which a large part of the water has been evaporated, including sweetened and unsweetened "condensed milk," "evaporated milk," "condensed cream," and "evaporated cream." These names are rather indiscriminately used, as cream or even enriched milk is seldom condensed or evaporated, while it is unfortunately true, on the other hand, that much poor and skimmed milk is condensed without being so marked or named.

MILK PRICES.

The census returns of the prices to patrons for milk are probably not altogether reliable, although they can not be far from the truth. It appears that for the census year the average price paid to producers delivering milk to butter factories was 77 cents per 100 pounds, while cheese factories paid an average of 78 cents and condensed-milk factories \$1.11. According to the returns, the prices for milk for making butter ranged from 64 and 65 cents per 100 pounds in Kansas, South Dakota, Utah, and Wyoming, and 77 cents (the average) in Illinois and Iowa, to 82 cents in New York, 86 (average) in California, Oregon, and Washington, 90 in Pennsylvania, 93 in New Hampshire, 95 in Massachusetts, and \$1.08 in Connecticut. For cheese making, the factories paid an average of 86 cents per 100 pounds for milk in California, 83 cents in New York, 76 in Michigan, 74 in Wisconsin, and 72 in Ohio. Condenseries are reported as paying 96 cents per 100 pounds for milk in Illinois, \$1.14 in California, \$1.15 in Pennsylvania, and \$1.35 in New York.

AGGREGATE PRODUCTION OF BUTTER AND CHEESE.

The total of 1,071,745,127 pounds of butter made on farms and 420,954,016 pounds in creameries (including urban establishments) give an aggregate production of 1,492,699,143 pounds of butter in the United States for the last census year; and the census authorities estimate that in addition more than 50,000,000 pounds were actually made which escaped the returns.

It is interesting to note that, while the extension of the associated system has been such as to raise apparently the product of the creameries during the decade of 1890-1900 from 15.2 to 28.2 per cent of

the entire quantity of butter made in this country, the portion reported from farms has increased less than 50,000,000 pounds, and has relatively decreased from 81.8 per cent of the whole to 71.8 per cent.

This aggregate annual production of butter is at the rate of 502 pounds to every square mile of land area in the United States, exclusive of Alaska, and furnishes a supply of 19.57 pounds per capita of the population, being 14.06 pounds of farm dairy butter and 5.51 pounds of creamery butter. According to the Eleventh Census the per capita supply was 16.33 pounds from the farm and 2.91 pounds from the factory, or 19.24 pounds in all. In 1880 the supply was 15.50 and 0.58 pounds, or 16.08 per unit of population. In other census years the returns show, for 1870, a supply of 13.33 pounds per capita; for 1860, 14.62 pounds; and for 1850, 13.51 pounds.

As a rule the States producing the greatest quantities of butter in factories are also those in which the quantities made on farms are greatest. Ohio is a notable exception; it produced 79,551,299 pounds of butter on farms, which is more than any other State, while its creamery product was comparatively small, being only 8,117,321 pounds. By combining the products of farm and factory the five States which lead all the others in total butter produced appear as follows: Iowa stands first, with 139,022,552 pounds, and then follow New York, 115,606,980 pounds; Pennsylvania, 111,394,966 pounds; Wisconsin, 106,573,740 pounds; and Illinois, 86,600,162 pounds. In Iowa and Wisconsin creameries produced more than farms, but in Pennsylvania, New York, and Illinois the reverse was true. According to the Eleventh Census the five States showing the greatest production of butter were Iowa, New York, Pennsylvania, Illinois, and Ohio; Wisconsin held the sixth place.

Of cheese, the total production on farms, for the last census year, was 16,372,330 pounds, and in factories (of all kinds) it was 282,634,488 pounds, or an aggregate of 299,006,818 pounds. Compared with the reports of the Eleventh Census, the total made on the farm has decreased and the total factory product has increased. But although the increase for the decade appears to have been 42,000,000 pounds, the returns in 1890 are known to have been so incomplete that it is altogether probable that as much cheese, if not more, was then made in this country as in the year 1900 or at the present time. The total supply appears to have been at the rate of 4.1 pounds in 1890 and 3.9 pounds in 1900 per capita of the population.

The transfer of this branch of the dairy industry from farm to factory, which has been so notable from the time the associated system became known, and which has been even more marked in regard to cheese than butter, seems to be steadily progressing. The Eleventh Census gave the farm-made cheese as 7.25 per cent of the total prod-

uct, and the Twelfth Census gives this portion as only 5.5 per cent. Besides this, cheese manufacture, so far as large operations are concerned, seems to be concentrating in certain regions. The ten States reported in 1890 as leading in total cheese production were New York, Wisconsin, Ohio, Illinois, Vermont, Iowa, Pennsylvania, Michigan, California, and Minnesota. Of these the first three named still stand at the head and in the same order; all show a somewhat increased product during the decade. Pennsylvania and Michigan now come next. These five are the only States each credited with more than 10,000,000 pounds of cheese in 1900. California has the sixth place with a product of 6,916,131 pounds, which is an increase. The other four States, although following in the order above named, all show decreased production. The cheese factories in these same States in 1900 (including establishments making some butter also) numbered as follows: New York, 1,274; Wisconsin, 1,286; Ohio, 320; Pennsylvania, 140; Michigan, 135; California, 32; Illinois, 118; Vermont, 71; Iowa, 89; and Minnesota, 55; no other State had as many as 40. It is further interesting to note that Wisconsin, Pennsylvania, and California all report increased quantities of cheese made on the farm, while in all the other States named there has been a falling off in this item. California produced 4,249,588 pounds of farm-made cheese in 1900, against 2,676,543 pounds made in factories; this is the only instance of the kind and the only State reporting as much as 3,000,000 pounds made on farms. The State of Maine furnishes a good example of the changes in cheese-making which have taken place in some sections during the last quarter century. Twenty-five years ago this State had 60 cheese factories and now has 16. New York and Wisconsin continue to be the great cheese-producing States of the Union. They are credited for 1900 with totals of 130,371,034 pounds and 79,384,298 pounds, respectively. Together they produced 209,755,332 pounds, or more than two-thirds of all the cheese made in the United States.

The growth of the production of butter and cheese in the United States, as reported by the census for successive decades, together with the relative products of farms and factories, is graphically shown on Plate II, and the relative production of the several States, or of most of them, with the division into farm and factory products, may be seen by the diagram on Plate III.

AGGREGATE VALUE OF THE DAIRY PRODUCTS OF THE UNITED STATES FOR 1900.

From the foregoing statistics, including values reported or estimated for different products, the following statement of the aggregate annual value of the dairy products of the country at the time of the last census is compiled. One cent per pound, or approximately 2 cents per

quart, is assigned to the value of milk consumed as human food, and three-fourths of this for the milk fed to calves or similarly used on farms. The by-products, which constitute a considerable sum, include commercial casein and sugar of milk as principal items:

Values of dairy products, 1900.

Butter	\$263, 256, 852
Cheese	28, 060, 362
Condensed milk	11, 888, 792
Cream sold	4, 547, 536
Milk consumed	217, 512, 586
Milk fed to calves	39, 000, 000
By-products	41, 049, 226
Total	605, 315, 354

To this aggregate should be added the value of the calves dropped by dairy cows during the year. There were doubtless nearly 18,000,000 calves, which were fairly rated at \$1 each at time of birth. The great aggregate production of the dairy cows of the United States may therefore be placed at \$620,000,000 to \$625,000,000 per year.

THE LEADING DAIRY STATES OF THE UNION.

In making a comparison of the different States from a dairy standpoint, Iowa is conspicuous as a producer of butter, New York of cheese, Wisconsin of both butter and cheese, New York again of market milk, and Illinois of condensed milk. With regard to all dairy interests and the quantity of combined products, the number of cows kept for milk (with their relative average yield and consequently the total milk product) is the natural basis for comparison. Hence the five leading dairy States should be named in this order: New York, Iowa, Pennsylvania, Wisconsin, and Illinois. (These are also the States greatest in associated or factory dairying, but in a different order.) Iowa precedes Wisconsin by reason of its greater number of cows and aggregate production, and Pennsylvania comes before Wisconsin and Illinois because of the relatively better quality of its cows, although fewer in number. For the same reason Wisconsin, with less than 1,000,000 cows, outranks Illinois with more than 1,000,000.

The same general subject may be viewed in another way. Although a certain number of cows may be of such better capacity as to produce more milk than a larger number of animals, it is also true that a less quantity of milk and its products may have higher value than a greater quantity, by reason of accessibility to better markets. Hence a reasonable basis of comparison is the aggregate value of dairy products other than those consumed on the farms. Of these latter there are no reliable data available as to value. The values of all butter, cheese, cream, and condensed milk sold by factories, and the values of all butter and cheese sold from the farms, are given in the census

tables. By obtaining the difference between the farm sales of milk and cream and the receipts of same by all factories, the values may be found of such sales that did not enter into manufactured products previously noted. These represent approximately the values of market milk and cream. Adding these values, aggregates are obtained which represent the total products of the dairy sold from farms, as follows: New York, \$53,316,712; Pennsylvania, \$29,029,522; Wisconsin, \$25,793,002; Illinois, \$23,633,960; and Iowa, \$22,101,777. New York exceeds the other States in every item in the list and especially in its enormous sales of milk and cream for consumption in their natural form. It is this item which gives Pennsylvania the second place in this arrangement, and Illinois a position before Iowa, although the latter has 400,000 or 500,000 more cows than either of the other two.

IMPORTS AND EXPORTS OF DAIRY PRODUCTS.

Before considering the supplies of different dairy products available for consumption in the United States, it is necessary to make proper allowances for supplies imported from foreign countries and for corresponding exports. The imports and exports of these products by the United States have been extremely variable, year by year, and especially the exports. During the last half century the quantity of butter imported has ranged from 29,000 pounds in 1899 to 4,843,000 pounds in 1871. The range of exports during the same period has been from 1,324,000 pounds in 1869 to 39,236,000 pounds in 1880. A comparison of the averages by decades is more satisfactory than the selection of single years.

TABLE VII.—*Imports and exports of butter by the United States.*

ANNUAL AVERAGES BY DECADES.

	1850-1859.	1860-1869.	1870-1879.	1880-1889.	1890-1899.
	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>
Imports	1,321,541	3,563,542	2,161,795	569,607	100,601
Exports	3,257,404	13,960,668	11,523,252	19,769,631	18,297,057

ANNUAL AVERAGES FOR SINGLE YEARS.

	1899.	1900.	1901.	1902.
	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>
Imports	29,469	64,490	125,568	524,434
Exports	27,308,869	13,283,557	24,249,565	8,959,316

Similar statistics follow for cheese. The range of imports for fifty years has been from 334,000 pounds in 1850 to 18,875,000 pounds in 1902; and for exports 3,764,000 pounds in 1853 to 148,000,000 pounds in 1881.

TABLE VIII.—*Imports and exports of cheese by the United States.*

ANNUAL AVERAGES BY DECADES.

	1850-1859.	1860-1869.	1870-1879.	1880-1889.	1890-1899.
	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>
Imports	808, 838	1, 345, 513	2, 785, 730	5, 946, 780	10, 054, 345
Exports	7, 603, 885	40, 470, 229	92, 966, 680	107, 375, 584	65, 434, 957

ANNUAL AVERAGES FOR SINGLE YEARS.

	1899.	1900.	1901.	1902.
	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>
Imports	13, 167, 487	14, 356, 983	16, 188, 640	18, 875, 740
Exports	34, 686, 833	54, 059, 049	31, 396, 115	19, 095, 438

It should be noted that the figures for imports prior to 1870 are not reliable.

Condensed milk is both imported and exported, the export trade in this commodity being of steady growth. But the Treasury Department reports values only, not quantities. The best course possible for approximating quantities is to value imports at 10 cents per pound and exports at 8 cents. Upon this estimate the following table is compiled:

TABLE IX.—*Imports and exports of condensed milk.*

ANNUAL AVERAGES FOR STATED DECADES.

	1870-1879.	1880-1889.	1890-1899.
	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>
Imports	362, 462	3, 031, 471	825, 390
Exports	1, 382, 520	2, 670, 001	5, 166, 889

ANNUAL AVERAGES FOR SINGLE CALENDAR YEARS.

	1899.	1900.	1901.	1902.
	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>
Imports	502, 860	479, 960	368, 970	244, 590
Exports	14, 850, 712	16, 101, 588	20, 582, 237	13, 625, 637

The imports of condensed milk have ranged from 182,840 pounds in 1875 to 6,691,850 pounds in 1886; the exports, from 181,450 pounds in 1864 to 20,582,237 pounds in 1901.

CONSUMPTION OF DAIRY PRODUCTS IN THE UNITED STATES.

It is a simple matter to compute the per capita consumption of butter and cheese in this country if the aggregate production as heretofore given is accepted as correct. To the aggregate of all made on farms and in factories, including urban establishments, the imports

must be added and the exports deducted. The products being reported for the calendar year of 1899, the imports and exports must be for that year also. Upon this basis the net quantity of butter available for consumption in that census year was 1,465,299,727 pounds. This provided 19.6 pounds per annum for each inhabitant, assuming the population for 1899 to have been about 75,000,000. If, without changing this last-named divisor, the estimate of the census officials is accepted or partly accepted as to butter actually made but not included in the tables, the rate of consumption per capita would be increased to approximately 20½ pounds.

In like manner the quantity of cheese found available was 278,538,146 pounds, or 3.72 pounds per capita of the population.

A similar computation may be made for condensed milk, the total quantity available being 172,647,355 pounds, or at the rate of 2.3 pounds. This result is surprising, but may be regarded as approximately correct.

In making an estimate of the consumption of natural milk the problem is more complex and factors more uncertain. The safest method is to compute the quantity of milk necessary to make all the butter, cheese, and condensed milk reported, together with allowance made for feeding calves, and find the difference between that sum and the total milk reported produced on farms, plus the estimated production by cows not on farms. The quantity of "whole" or unskimmed milk available for consumption is thus found to be 21,751,258,560 pounds, which allows 290.1 pounds per capita per annum. This is at the rate of 0.79 of 1 pound of milk per day, or a trifle less than three-fourths of a pint. To this annual allowance of natural milk per inhabitant should be added the condensed milk shown by the last paragraph to be used in this country. The 2.3 pounds of condensed milk is equivalent to 9.2 pounds of fresh milk. Therefore the per capita supply of milk just determined may be rightly increased to 299.3 pounds per year, of which over 3 per cent is in the condensed form.

An entirely independent investigation made during the past two years has determined the best possible estimates of the milk supply, and the consumption of milk per day per capita in nearly all the cities and many of the large towns of the United States. The health boards and officers and milk inspectors (where employed) have been the officials consulted. The following interesting results have been obtained:

Average estimated consumption of milk per day per capita.

	Pint.
In 38 cities having each a population exceeding 100,000.....	0.61
In 38 cities of less than 100,000 but over 50,000.....	.63
In 61 cities of less than 50,000 but over 25,000.....	.58
In 120 cities and towns of less than 25,000 inhabitants	.52

These estimates bear evidences of approximate accuracy. For various reasons the figures from the medium-sized cities are deemed more accurate than those from either the largest or the smallest. It thus appears that the probable average consumption of milk per capita in these 257 cities and towns is less than 0.6 pint per day. After careful study and numerous allowances for errors, 0.6 pint is accepted as the most accurate estimate. The population of these 257 cities aggregates 20,411,265, or more than one-fourth of the entire country. The rate of consumption by the inhabitants of towns and villages and by those of the farms—we are still considering whole, or unskimmed, milk—can not be much greater than this. Ten years ago the writer believed that the rate was but a little over one-half pint per day—perhaps 0.52 or 0.53 pint—for the entire country. At present, it is believed that 0.6 is a fair average daily rate of milk consumption for all; and yet, in concession to the opinion of others, a rate of 0.65 of a pint per day per capita is accepted as possible. This is practically the same as 0.7 pound.

ESTIMATE OF DAIRY COWS AND DAIRY PRODUCTS IN THE UNITED STATES, 1903.

Based upon the foregoing statistics, with percentages of increase for people and for cows conservatively computed, and other modifications made for reasons explained, an estimate may be made as follows of the principal dairy data of the country for the year 1903:

Aggregate production of milk, estimated, for 1903.

	Pounds of milk.
Product of 19,000,000 cows, at 3,560 pounds each, per annum	67, 640, 000, 000
Disposition of the milk product:	
1,650,000,000 pounds of butter require	38, 775, 000, 000
360,000,000 pounds of cheese require	3, 000, 000, 000
250,000,000 pounds of condensed milk require	1, 000, 000, 000
20,000,000 gallons of cream require	902, 000, 000
15,000,000 calves, estimated to consume	3, 139, 750, 000
81,500,000 persons, at 0.7 pound per day, will require per annum	20, 823, 250, 000
Total milk accounted for	67, 640, 000, 000

According to this statement, the cows of the United States may be arbitrarily assigned to productive duty for the year 1903 as follows:

	Cows.
For milk, condensed milk, and cream	6, 400, 000
For butter (151½ pounds each per year)	10, 900, 000
For cheese (356 pounds each per year)	840, 000
For rearing calves	860, 000
Total number of cows, estimated	19, 000, 000

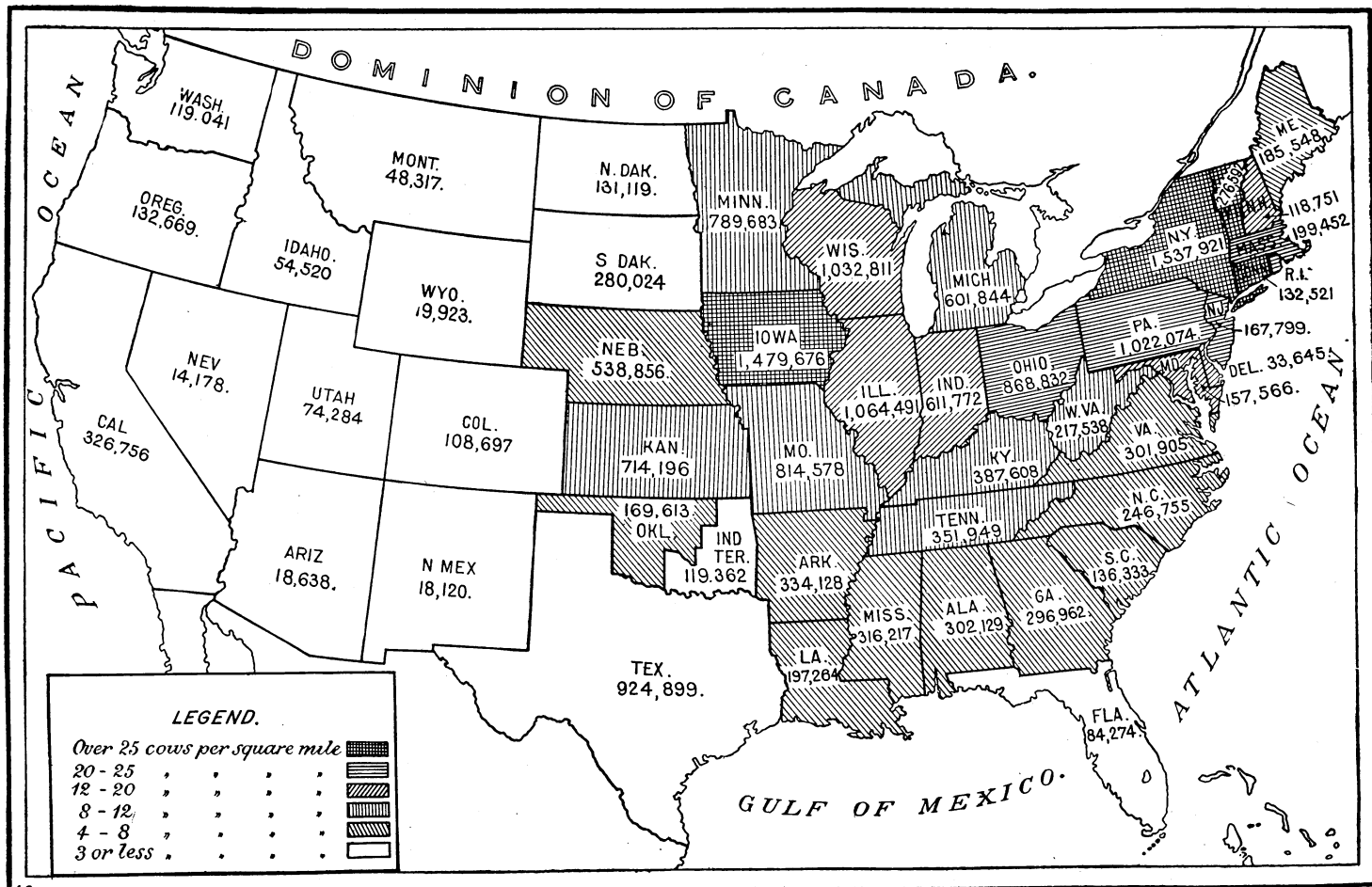
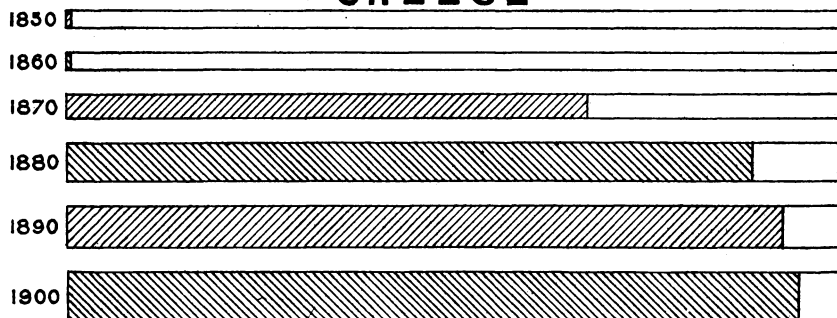


DIAGRAM SHOWING NUMBER AND DISTRIBUTION OF MILCH COWS IN THE UNITED STATES, 1900.

CHEESE

THIS SURFACE REPRESENTS
50,000,000 POUNDS.

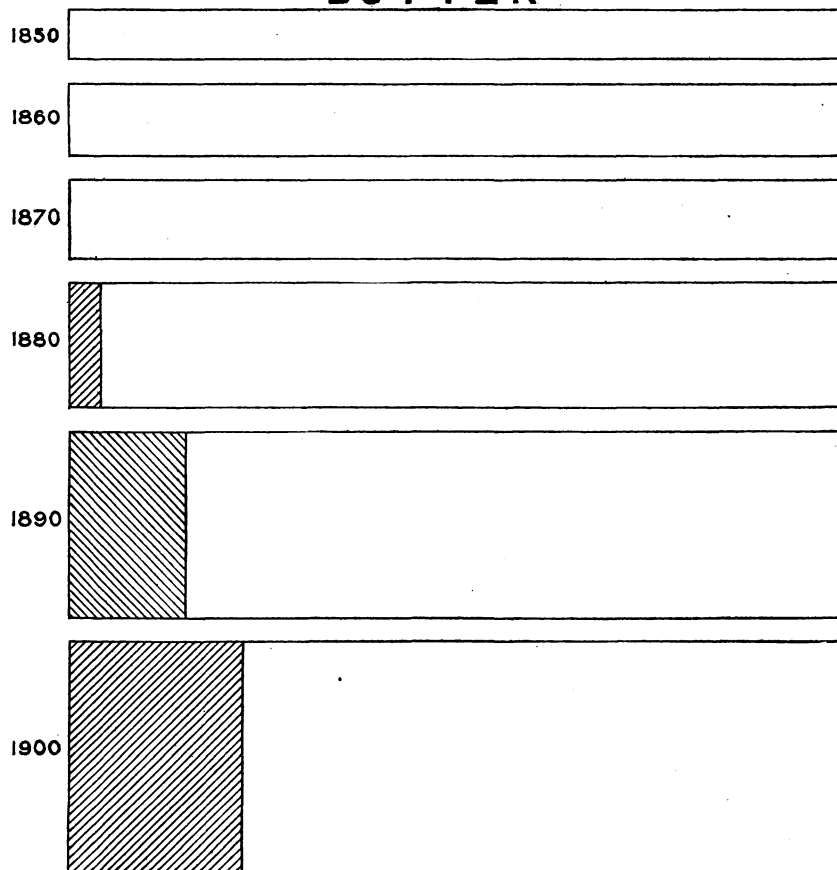
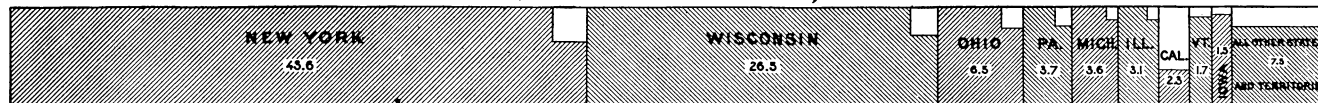
BUTTER

DIAGRAM SHOWING CHEESE AND BUTTER PRODUCTION, SIX CENSUS YEARS.

[Factory and creamery production are shaded.]

CHEESE PRODUCTION, 1900.



THIS SURFACE REPRESENTS
10,000,000 POUNDS.

SHADED PORTION REPRESENTS FACTORY
OR CREAMERY PRODUCT.
OPEN PORTION REPRESENTS PRODUCT
MADE ON FARMS.

BUTTER PRODUCTION, 1900.

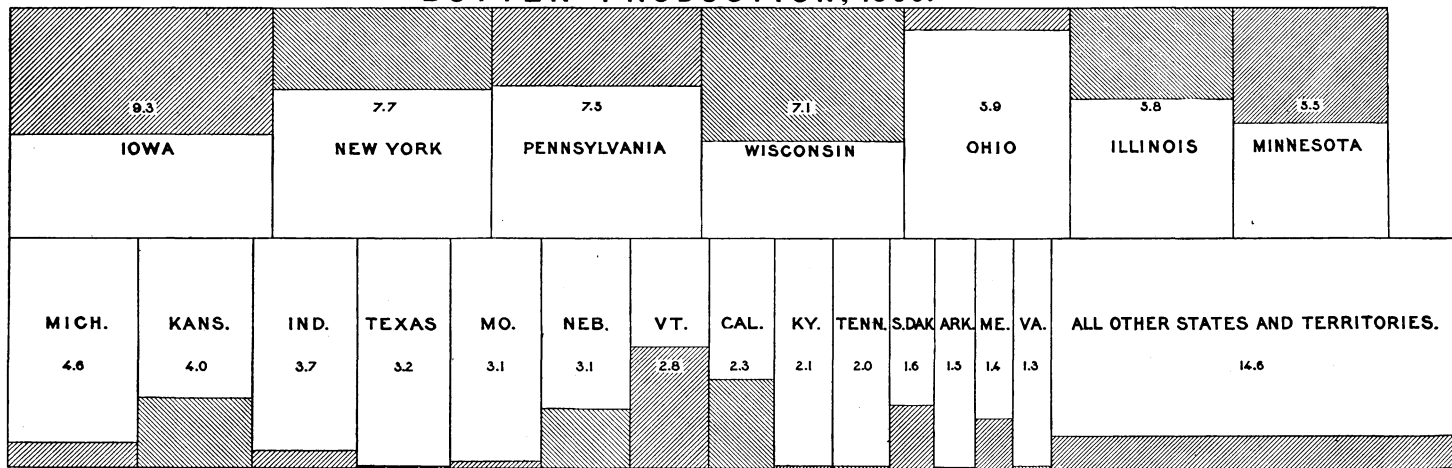


DIAGRAM SHOWING TOTAL CHEESE AND BUTTER PRODUCTION OF THE UNITED STATES IN 1900, BY STATES AND TERRITORIES, ARRANGED ACCORDING TO RANK.

[The number in the center of each subdivision denotes the percentage of the total product represented which was made in that State.]

GENERAL AGRICULTURAL STATISTICS.

TABLE X.—*Farm and dairy statistics of the United States.*

	From the United States census of—				
	1900.	1890.	1880.	1870.	1860. ^a
Population	76, 303, 387	62, 622, 250	50, 155, 783	38, 558, 371	31, 443, 322
Occupations:					
Total persons reported	29, 285, 922	22, 735, 661	17, 392, 000	.....	.....
Number in agriculture	<i>b</i> 10, 329, 764	8, 466, 251	7, 670, 493	5, 922, 471	3, 221, 574
Farms:					
Total number	5, 739, 764	4, 564, 641	4, 008, 907	2, 659, 985	2, 044, 077
Area, total	841, 201, 546	623, 218, 619	536, 081, 835	407, 735, 041	407, 212, 538
Acres unimproved, percent- age	50.7	42.6	46.9	53.7	59.9
Average size	147	137	134	153	199
Number cultivated by owner.	3, 713, 371	3, 269, 728	2, 984, 306	.....	.....
Number rented for money....	752, 920	454, 659	322, 357	.....	.....
Value land and improve- ments, with buildings, etc., dollars.....	16, 674, 690, 247	13, 279, 252, 649	10, 197, 096, 776	9, 262, 803, 861	6, 645, 045, 007
Value implements and ma- chinery.....dollars...	761, 261, 550	494, 247, 467	406, 520, 055	336, 878, 429	246, 118, 141
Value live stock, all kinds, dollars.....	3, 078, 050, 041	2, 208, 767, 573	1, 500, 384, 707	1, 525, 276, 457	1, 089, 329, 915
Value farm products, an- nual ^c .....dollars...	4, 739, 118, 752	2, 460, 107, 454	2, 212, 540, 927	2, 447, 538, 658	.....
Cattle:					
Milch cows on farms, num- ber	<i>d</i> 17, 139, 674	16, 511, 950	12, 443, 120	8, 935, 332	8, 585, 735
All others on farms. number.	<i>e</i> 35, 349, 563	34, 851, 622	23, 482, 391	14, 885, 276	17, 034, 284
Cows to every 1,000 of population.	<i>d</i> 225	264	248	232	273
Milk, total produced on farms, gallons	7, 266, 392, 674	5, 209, 125, 567	530, 129, 755	235, 500, 599	(<i>f</i>)
Butter made on farms ^g .. pounds..	1, 071, 745, 127	1, 024, 223, 468	777, 250, 287	514, 092, 683	459, 681, 372
Cheese made on farms ^g do....	16, 372, 330	18, 726, 818	27, 272, 489	53, 492, 153	103, 663, 927

^aThe Seventh United States Census (1850) gives the number of milch cows 6,385,094; value of dairy products for year, \$166,193,144. The Sixth United States Census (1840) gives number of milch cows 4,837,043; value, \$72,555,000; value of dairy products for year, \$120,926,075.

^bExclusive of wood choppers, lumbermen, and raftsmen.

^cThe value of farm products for 1869 (census of 1870) included "betterments and additions to stock," so that in products only there was an actual increase in 1880 as compared with 1870. The total value of 1890, compared with 1880, showed only slight increase, although increase in the products themselves was very great; rapid decrease in market prices accounts for this difference. The great increase shown in 1900 over 1890 may doubtless be partially accounted for by more complete returns.

^dThis refers to cows on farms and ranges.

^eExclusive of 15,333,099 calves under 1 year, and 973,033 cows and 643,389 other animals not on farms and ranges.

^fNo returns of milk product were made for 1850 and 1860. The great variation in the figures given results from these facts: In 1870 only "milk sold from farms" was reported, thus omitting all consumed on farms and there made into butter and cheese; in 1880 "milk sold or sent to butter and cheese factories" was included, again excluding home consumption; in 1890 and also in 1900 the returns endeavored to show the total quantity of milk produced on farms.

^gTo butter and cheese made on farms must be added that made at creameries and cheese factories to get the total product of the country. (See Table XIII.) The progressive increase in the production of butter and cheese in the United States, and the ratio of farm and factory product, is graphically shown by Plate II.

TABLE X.—Farm and dairy statistics of the United States—Continued.

	From the United States census of—				
	1900.	1890.	1880.	1870.	1860.
Creameries, cheese factories, etc.:					
Number <i>a</i>	9,355	4,712	3,932	1,313	5
Butter made in same, <i>b</i> pounds.....	420,954,016	181,284,916	29,421,784	.....	.....
Cheese made in same, <i>b</i> pounds.....	282,634,488	238,035,065	215,885,361	109,435,229	.....
Condensed milk.....pounds..	186,921,787	37,926,821	13,033,267	.....	.....
Capital employed...dollars..	36,508,015	16,624,163	9,604,803	3,690,075	13,400
Employees.....number..	15,693	14,921	7,903	4,607	13
Wages paid, annual, <i>d</i> dol- lars.....	6,170,670	5,390,705	1,546,495	706,566	3,060
Cost of materials....dollars..	109,151,205	51,364,574	18,363,579	14,089,284	10,791
Value of products.....do....	131,199,277	62,686,043	25,815,963	16,771,665	23,500
Total dairy products of United States, <i>e</i> value.....dollars..	605,315,354	411,976,522	391,131,618	360,828,000	240,400,580

a The establishments reported for 1850, 1860, and 1870 were all cheese factories. The figures for 1850 are approximately correct, but those for 1860 are not; more cheese factories are known to have been in active operation in that year in the State of New York alone. The number for 1890 represents only establishments reporting; it is believed that there were over 2,000 others in operation that year.

b To butter and cheese made on farms must be added that made at creameries and cheese factories to get the total product of the country. (See Table XIII.) The progressive increase in the production of butter and cheese in the United States, and the ratio of farm and factory product, is graphically shown by Plate II.

c The butter and cheese made in creameries and factories in 1889 (census of 1890) and also in 1899 (census of 1900) does not include the products of urban establishments. (See Table XIV.)

d This does not include salaries, \$915,442.

e The total values of dairy products prior to 1900 do not include the milk of "town cows" or cows not on farms, and the amounts given are thus much below the true value.

TABLE XI.—Dairy statistics by States.

[From the Twelfth United States Census.]

States and Territories.	Dairy cows on farms. ^a	Milk pro- duced on farms.	Butter made on farms.	Butter made at creameries.	Cheese made on farms.	Cheese made at factories.
	<i>Number.</i>	<i>Gallons.</i>	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>
The United States..	17,139,674	7,266,392,674	1,071,745,127	420,126,546	16,372,330	281,972,324
North Atlantic Division..	3,496,266	1,827,347,473	206,284,451	119,734,095	4,509,199	143,709,072
Maine.....	173,592	99,586,188	16,174,173	4,461,399	425,102	553,946
New Hampshire.....	115,036	60,724,590	6,385,611	5,034,270	104,339	116,741
Vermont.....	270,194	142,042,223	18,834,706	22,453,381	406,659	4,713,105
Massachusetts.....	184,562	105,571,873	4,980,262	4,591,919	19,629	250,542
Rhode Island.....	23,660	12,923,512	488,086	148,195	6,751	.....
Connecticut.....	126,434	68,951,862	4,591,789	3,888,405	40,623	321,263
New York.....	1,501,608	772,799,352	74,714,376	40,693,846	2,624,552	127,386,032
New Jersey.....	157,407	77,714,055	5,894,363	1,325,519	24,377	100,000
Pennsylvania.....	943,773	487,033,818	74,221,085	37,137,161	857,167	10,267,443
South Atlantic Division..	1,383,319	492,138,465	89,111,226	3,772,086	480,448	112,860
Delaware.....	32,591	12,681,268	1,629,949	969,889	104	15,000
Maryland.....	147,284	64,040,517	9,096,662	2,541,716	338,453	.....
District of Columbia..	1,251	850,349	3,478	.....	.....	.....
Virginia.....	281,876	105,068,428	19,905,830	170,521	31,697	57,000
West Virginia.....	205,601	83,861,660	16,913,129	41,000	74,243	40,860
North Carolina.....	233,178	89,525,749	16,913,802	.....	28,883	.....

^a Does not include 973,033 cows not on farms and ranges.

TABLE XI.—*Dairy Statistics by States*—Continued.

States and Territories.	Dairy cows on farms.	Milk pro- duced on farms.	Butter made on farms.	Butter made at creameries.	Cheese made on farms.	Cheese made at factories.
South Atlantic Division— Continued.	<i>Number.</i>	<i>Gallons.</i>	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>
South Carolina.....	126, 684	44, 031, 528	8, 150, 437	.....	1, 081	.....
Georgia.....	276, 024	82, 438, 532	15, 111, 494	48, 960	2, 236	.....
Florida.....	78, 830	9, 640, 434	1, 386, 445	.....	3, 751	.....
North Central Division ..	8, 490, 284	3, 609, 900, 328	539, 104, 750	271, 736, 947	5, 320, 122	128, 625, 971
Ohio.....	818, 239	425, 870, 394	79, 551, 299	8, 087, 631	1, 167, 001	18, 156, 527
Indiana.....	574, 276	263, 457, 239	51, 042, 396	3, 553, 483	178, 733	1, 260, 168
Illinois.....	1, 007, 664	457, 106, 995	52, 493, 450	34, 055, 312	323, 485	9, 055, 119
Michigan.....	563, 905	309, 617, 046	60, 051, 998	7, 820, 712	331, 176	10, 422, 582
Wisconsin.....	998, 397	472, 274, 264	44, 739, 147	61, 813, 502	1, 635, 618	77, 748, 680
Minnesota.....	753, 632	304, 017, 106	41, 188, 846	41, 174, 469	290, 623	3, 285, 019
Iowa.....	1, 423, 648	535, 872, 240	61, 789, 288	77, 233, 264	306, 428	4, 242, 637
Missouri.....	765, 386	258, 207, 755	45, 509, 110	1, 440, 616	323, 439	1, 072, 751
North Dakota.....	125, 503	48, 845, 280	9, 178, 815	463, 188	70, 881	225, 399
South Dakota.....	270, 634	99, 244, 975	17, 400, 970	6, 172, 107	136, 863	420, 779
Nebraska.....	512, 544	190, 477, 911	34, 518, 659	11, 726, 180	264, 430	313, 600
Kansas.....	676, 456	244, 909, 123	41, 640, 772	18, 196, 483	291, 445	2, 422, 710
South Central Division ..	2, 899, 236	973, 950, 188	185, 923, 330	932, 857	473, 440	181, 469
Kentucky.....	364, 025	159, 311, 527	30, 446, 381	184, 663	45, 759	28, 000
Tennessee.....	321, 676	147, 336, 961	29, 091, 696	207, 823	26, 622	6, 201
Alabama.....	279, 263	95, 882, 103	19, 121, 964	17, 357	36, 374	10, 000
Mississippi.....	299, 318	97, 030, 385	18, 881, 236	48, 525	28, 572	.....
Louisiana.....	184, 815	39, 251, 413	4, 918, 229	.....	135, 104	.....
Texas.....	861, 023	251, 342, 698	47, 991, 492	252, 714	136, 133	58, 290
Oklahoma.....	165, 852	47, 439, 853	8, 781, 359	53, 200	45, 264	66, 378
Indian Territory.....	110, 687	26, 493, 855	5, 105, 715	.....	1, 227	.....
Arkansas.....	312, 577	109, 861, 393	21, 585, 258	168, 575	18, 385	12, 600
Western Division.....	866, 528	362, 467, 850	51, 202, 299	23, 950, 561	5, 589, 109	9, 342, 952
Montana.....	45, 036	15, 696, 214	2, 454, 072	34, 238	30, 924	.....
Wyoming.....	18, 272	5, 121, 974	888, 554	29, 500	24, 327	1, 000
Colorado.....	100, 116	38, 440, 111	4, 932, 482	1, 566, 639	103, 184	1, 465, 257
New Mexico.....	16, 775	3, 009, 657	313, 003	.....	68, 571	.....
Arizona.....	17, 965	3, 056, 109	379, 311	424, 083	33, 305	373, 752
Utah.....	65, 905	25, 124, 642	2, 812, 122	2, 519, 214	169, 251	1, 874, 179
Nevada.....	13, 606	4, 446, 071	569, 523	623, 402	94, 082	80, 150
Idaho.....	51, 929	15, 122, 948	2, 520, 316	432, 570	196, 952	194, 380
Washington.....	107, 232	50, 182, 415	7, 372, 106	3, 198, 421	151, 669	1, 482, 127
Oregon.....	122, 447	48, 582, 968	8, 107, 450	1, 975, 357	467, 256	1, 195, 564
California.....	307, 245	153, 684, 741	20, 853, 360	13, 147, 137	4, 249, 588	2, 676, 543
Alaska.....	13	4, 250	200	.....	.....	.....
Hawaii.....	4, 028	584, 120	118, 871	.....	12	.....

TABLE XII.—*Progress of dairying in the United States, 1850 to 1900.*^a

[United States Census statistics.]

States and Territories.	Year of census.	Dairy cows on farms.		Milk, product reported.	Butter, total made.	Cheese, total made.	Creameries and cheese factories.	Milk, average yield per cow.
		Total number.	Per 1,000 persons.					
				<i>Gallons.</i>	<i>Pounds.</i>	<i>Pounds.</i>	<i>Number.</i>	<i>Gallons.</i>
United States..	1900	17, 139, 674	225	7, 266, 392, 674	1, 491, 871, 673	298, 344, 654	9, 355	424
	1890	16, 511, 950	264	5, 209, 125, 567	1, 205, 508, 384	256, 761, 883	<i>b</i> 4, 712	315
	1880	12, 443, 120	248	<i>c</i> 530, 129, 755	806, 672, 071	243, 157, 850	3, 932	233
	1870	8, 935, 332	232	<i>d</i> 235, 500, 599	514, 092, 683	162, 927, 882	<i>e</i> 1, 313	206
	1860	8, 585, 735	273	Not given.	459, 681, 372	103, 663, 927	<i>e</i> 5	175
	1850	6, 385, 094	275	Not given.	313, 345, 306	105, 535, 893	<i>e</i> 8	167
North Atlantic Division	1900	3, 496, 266	166	1, 827, 347, 473	326, 018, 546	148, 218, 271	3, 230	523
	1890	3, 351, 061	193	1, 435, 739, 255	295, 033, 716	139, 238, 694	1, 971	428
	1880	3, 190, 745	220	<i>c</i> 345, 749, 869	277, 008, 072	150, 902, 229	1, 975	.....
	1870	2, 833, 022	230	<i>d</i> 186, 605, 146	225, 910, 518	35, 144, 853	<i>e</i> 913	.....
	1860	2, 615, 929	.....	.....	223, 950, 757	72, 860, 013	.....	.....
	1850	2, 188, 503	.....	.....	173, 055, 728	79, 731, 981	.....	.....
Maine	1900	173, 592	250	99, 586, 188	20, 635, 572	979, 048	61	574
	1890	157, 278	238	57, 969, 791	16, 999, 356	1, 451, 813	42	369
	1880	150, 845	232	<i>c</i> 3, 720, 783	14, 109, 966	1, 945, 095	41	314
	1870	139, 259	222	<i>d</i> 1, 374, 091	11, 636, 482	1, 152, 590	0	270
	1860	147, 314	235	.....	11, 687, 781	1, 799, 862	.....	252
	1850	133, 556	229	.....	9, 243, 811	2, 434, 454	.....	229
New Hampshire.	1900	115, 036	279	60, 724, 590	11, 419, 881	221, 080	53	528
	1890	109, 423	290	42, 633, 268	9, 862, 430	444, 623	23	390
	1880	90, 564	261	<i>c</i> 5, 739, 128	7, 346, 340	807, 076	2	314
	1870	90, 583	285	<i>d</i> 2, 352, 884	5, 965, 080	872, 368	<i>e</i> 2	235
	1860	94, 880	291	.....	6, 956, 764	2, 232, 092	.....	247
	1850	94, 277	265	.....	6, 977, 056	3, 196, 563	.....	262
Vermont	1900	270, 194	786	142, 042, 223	41, 288, 087	5, 119, 764	255	526
	1890	231, 419	697	90, 712, 230	28, 399, 440	6, 191, 913	124	393
	1880	217, 033	654	<i>c</i> 6, 526, 550	25, 252, 663	6, 129, 879	85	387
	1870	180, 285	545	<i>d</i> 3, 835, 840	17, 844, 396	7, 814, 879	<i>e</i> 28	350
	1860	174, 667	554	.....	15, 900, 359	8, 215, 030	.....	328
	1850	146, 128	465	.....	12, 137, 980	8, 720, 834	.....	319
Massachusetts ...	1900	184, 562	66	105, 571, 873	9, 572, 181	270, 171	51	572
	1890	172, 046	77	82, 571, 924	10, 410, 300	385, 533	37	480
	1880	150, 435	84	<i>c</i> 29, 662, 953	9, 799, 804	2, 201, 393	22	396
	1870	114, 771	79	<i>d</i> 15, 284, 057	6, 559, 161	4, 131, 359	<i>e</i> 23	327
	1860	144, 492	117	.....	8, 297, 936	5, 294, 090	.....	215
	1850	130, 099	131	.....	8, 071, 370	7, 088, 142	.....	250
Rhode Island....	1900	23, 660	55	12, 923, 512	636, 281	6, 751	3	546
	1890	23, 943	69	10, 610, 547	1, 199, 239	324, 631	4	443
	1880	21, 460	78	<i>c</i> 3, 831, 706	1, 007, 103	67, 171	0	323
	1870	18, 806	87	<i>d</i> 1, 944, 044	941, 199	81, 976	0	259
	1860	19, 700	113	.....	1, 021, 767	181, 511	.....	166
	1850	18, 698	126	.....	995, 670	316, 508	.....	180
Connecticut	1900	126, 434	139	68, 951, 862	8, 480, 194	361, 886	72	545
	1890	127, 892	171	54, 413, 822	10, 369, 259	308, 521	50	425

^a Does not include the products from cows in barns and inclosures.^b See note *b* of Table X.^c "Milk sold or sent to butter and cheese factories, gallons," census, 1880.^d "Milk sold from farms, gallons," census, 1870.^e Cheese factories only.

TABLE XII.—Progress of dairying in the United States, 1850 to 1900—Continued.

States and Territories.	Year of census.	Dairy cows on farms.		Milk product reported.	Butter, total made.	Cheese, total made.	Creameries and cheese factories.	Milk, average yield per cow.
		Total number.	Per 1,000 persons.					
North Atlantic Division—Continued.				<i>Gallons.</i>	<i>Pounds.</i>	<i>Pounds.</i>	<i>Number</i>	<i>Gallons.</i>
Connecticut	1880	116,319	187	a 12,289,893	8,418,906	1,051,677	16	325
	1870	98,889	184	b 6,253,259	6,716,007	2,262,894	c 7	291
	1860	98,877	215	.....	7,620,912	3,898,411	.....	277
	1850	85,461	230	.....	6,498,119	5,363,277	.....	301
New York	1900	1,501,608	207	772,799,352	115,408,222	130,010,584	1,928	515
	1890	1,440,230	240	663,917,240	112,727,515	124,086,524	1,337	461
	1880	1,437,855	283	a 231,965,533	120,878,201	129,163,714	1,652	402
	1870	1,350,661	308	b 135,775,919	107,147,526	100,776,012	c 818	358
	1860	1,123,634	290	.....	103,097,280	48,548,289	.....	326
	1850	931,324	301	.....	79,766,094	49,741,413	.....	319
New Jersey	1900	157,407	84	77,714,055	7,219,882	124,377	53	494
	1890	161,576	112	64,003,953	8,866,749	587,241	16	396
	1880	152,078	134	a 15,472,783	9,872,237	569,736	11	290
	1870	133,331	147	b 5,373,323	8,266,023	478,336	c 8	227
	1860	138,818	207	.....	10,714,447	182,172	.....	233
	1850	118,736	242	.....	9,487,210	365,756	.....	243
Pennsylvania ...	1900	943,773	150	487,033,818	111,358,246	11,124,610	754	516
	1890	927,254	176	368,906,480	96,199,428	5,457,897	338	398
	1880	854,156	199	a 36,540,540	80,322,852	8,966,737	146	323
	1870	706,437	201	b 14,411,729	60,834,644	2,792,676	c 27	281
	1860	673,547	232	.....	58,653,511	2,508,556	.....	266
	1850	530,224	229	.....	39,878,418	2,505,034	.....	231
South Atlantic Division	1900	1,383,319	132	492,138,465	92,883,312	593,308	129	356
	1890	1,369,466	155	331,728,677	80,414,839	415,291	50	242
	1880	1,280,761	169	a 9,446,511	48,703,330	640,065	31	.....
	1870	1,001,094	171	b 3,187,589	28,575,306	190,890	c 5	.....
	1860	1,238,633	.....	.....	33,941,403	369,302	.....	.....
	1850	1,246,678	.....	.....	28,105,896	610,836	.....	.....
Delaware	1900	32,591	176	12,681,268	2,599,838	15,104	22	389
	1890	32,574	194	10,699,362	2,493,259	359	6	328
	1880	27,284	186	a 1,132,434	1,902,075	1,712	3	248
	1870	24,082	192	b 758,603	1,171,963	315	0	178
	1860	22,595	202	.....	1,430,502	6,579	.....	190
	1850	19,248	209	.....	1,055,308	3,187	.....	165
Maryland	1900	147,284	124	64,040,517	11,638,378	338,453	88	435
	1890	142,198	136	46,601,218	10,846,879	23,573	24	328
	1880	122,907	131	a 4,722,944	7,715,196	79,416	14	221
	1870	94,794	121	b 1,520,101	5,014,729	6,732	0	175
	1860	99,463	145	.....	5,265,295	8,342	.....	159
	1850	86,856	149	.....	3,806,160	3,975	.....	132
Dist. Columbia ..	1900	1,251	4	850,349	3,478	.....	.....	680
	1890	863	4	459,978	13,769	.....	4	533
	1880	1,292	7	a 496,789	88,520	155,460	1	433
	1870	657	5	b 126,077	4,495	.....	0	212
	1860	639	9	.....	18,835	.....	.....	88
	1850	813	16	.....	14,872	1,500	.....	57

a "Milk sold or sent to butter and cheese factories, gallons," census, 1880.

b "Milk sold from farms, gallons," census 1870.

c Cheese factories only.

TABLE XII.—*Progress of dairying in the United States, 1850 to 1900—Continued.*

[United States Census statistics.]

States and Territories.	Year of census.	Dairy cows on farms.		Milk, product reported.	Butter, total made.	Cheese.	Creameries and cheese factories.	Milk, average yield per cow.
		Total number.	Per 1,000 persons.					
South Atlantic Division—Continued.				<i>Gallons.</i>	<i>Pounds.</i>	<i>Pounds.</i>	<i>Number</i>	<i>Gallons.</i>
Virginia.....	1900	281,876	152	105,068,428	20,076,351	88,697	10	373
	1890	273,634	165	78,143,459	18,761,856	218,187	13	286
	1880	243,061	161	a 1,224,469	11,500,023	111,535	4	147
	1870	188,471	154	b 266,812	6,979,269	84,243	c 2	113
	1860	330,713	207	.....	13,464,722	280,852	.....	123
	1850	317,619	223	.....	11,089,359	436,292	.....	106
West Virginia..	1900	205,601	214	83,861,660	16,954,129	115,103	5	408
	1890	188,492	247	59,449,066	14,081,627	95,372	3	315
	1880	156,956	254	a 750,279	9,309,517	196,987	7	184
	1870	104,434	236	b 144,895	5,044,475	32,429	0	147
North Carolina..	1900	233,178	123	89,525,749	16,913,802	28,883	.....	384
	1890	223,416	138	55,250,665	13,129,374	60,760	0	247
	1880	232,133	166	a 446,798	7,213,507	57,380	2	95
	1870	196,731	184	b 17,145	4,297,834	123,985	c 3	66
	1860	228,623	230	.....	4,735,495	51,119	.....	62
	1850	221,799	255	.....	4,146,290	95,921	.....	57
South Carolina..	1900	126,684	95	44,031,528	8,150,437	1,081	.....	348
	1890	107,184	93	23,833,631	5,737,557	2,476	0	222
	1880	139,881	140	a 257,186	3,196,851	16,018	0	71
	1870	98,693	140	b 241,815	1,461,980	169	0	47
	1860	163,938	233	.....	3,177,934	1,543	.....	58
	1850	193,244	289	.....	2,981,850	4,970	.....	46
Georgia.....	1900	276,024	125	82,438,532	15,160,454	2,236	4	299
	1890	287,717	157	52,234,508	14,483,323	12,833	0	182
	1880	315,073	204	a 374,645	7,424,485	19,151	0	72
	1870	231,310	195	b 109,139	4,499,572	4,292	0	59
	1860	299,688	284	.....	5,439,765	15,587	.....	55
	1850	334,223	369	.....	4,640,559	46,976	0	42
Florida.....	1900	78,830	149	9,640,434	1,386,445	3,751	.....	122
	1890	113,388	290	5,056,790	867,195	1,731	0	45
	1880	42,174	157	a 40,967	353,156	2,406	0	26
	1870	61,922	329	b 3,002	100,989	25	0	5
	1860	92,974	664	.....	408,855	5,280	.....	13
	1850	72,876	838	.....	371,498	18,015	.....	16
North Central Division.....	1900	8,490,284	322	3,609,900,328	810,841,697	133,946,093	5,481	425
	1890	8,240,999	369	2,719,414,765	650,551,588	110,225,861	2,617	318
	1880	5,402,081	311	a 155,044,519	383,455,099	86,532,570	1,648	.....
	1870	3,294,007	254	b 38,853,454	214,400,425	14,178,005	388	.....
	1860	2,556,536	.....	.....	153,071,558	28,238,411	.....	.....
	1850	1,564,219	.....	.....	80,563,732	24,547,518	.....	.....
Ohio.....	1900	818,239	197	425,870,394	87,638,930	19,323,528	484	520
	1890	794,833	216	326,925,396	81,522,792	22,254,054	361	411
	1880	767,043	240	a 46,801,537	69,722,506	32,531,683	452	329
	1870	654,390	246	b 22,275,344	50,266,372	24,153,876	195	279
	1860	676,585	289	.....	48,543,162	21,618,893	.....	253
	1850	544,499	275	.....	34,449,379	20,819,542	.....	234

a "Milk sold or sent to cheese and butter factories, gallons," census, 1880.

b "Milk sold from farms, gallons," census, 1870.

c Cheese factories only.

TABLE XII.—*Progress of dairying in the United States, 1850 to 1900—Continued.*

States and Territories.	Year of census.	Dairy cows on farms.		Milk, product reported.	Butter, total made.	Cheese, total made.	Creameries and cheese factories.	Milk, average yield per cow.
		Total number.	Per 1,000 persons.					
North Central Division—Continued.								
Indiana	1900	574,276	228	<i>Gallons.</i> 263,457,239	<i>Pounds.</i> 54,595,879	<i>Pounds.</i> 1,438,901	<i>Number</i> 113	<i>Gallons.</i> 459
	1890	579,287	264	200,510,797	50,154,854	1,191,500	55	346
	1880	494,944	250	a 6,723,840	37,712,316	1,676,825	49	241
	1870	393,736	234	b 936,983	22,915,385	391,487	17	179
	1860	363,553	269	.....	18,306,651	605,795	.....	153
Illinois	1850	284,554	288	.....	12,881,535	624,564	.....	138
	1900	1,007,664	209	457,106,995	86,548,762	9,378,604	534	454
	1890	1,087,886	284	367,269,464	82,674,908	10,348,933	266	338
	1880	865,913	281	a 45,419,719	60,208,972	21,253,194	285	240
	1870	640,321	252	b 9,258,545	36,083,405	5,734,004	69	187
Michigan	1860	522,634	305	.....	28,052,551	1,848,557	.....	165
	1850	294,671	346	.....	12,526,543	1,278,225	.....	133
	1900	563,905	233	309,617,046	67,872,710	10,753,758	290	549
	1890	497,611	238	224,537,488	52,343,212	5,370,460	101	451
	1880	384,578	235	a 7,898,273	38,865,106	3,953,585	74	325
Wisconsin	1870	250,859	127	b 2,277,122	24,400,185	2,301,801	30	304
	1860	179,543	240	.....	15,503,482	1,641,897	.....	270
	1850	99,676	250	.....	7,065,878	1,011,492	.....	225
	1900	998,397	483	472,274,264	106,552,649	79,384,298	2,019	473
	1890	792,620	470	303,701,134	60,355,499	54,614,861	966	383
Minnesota	1880	478,374	364	a 25,156,977	33,842,336	19,535,324	414	267
	1870	308,377	292	b 2,059,105	22,473,036	3,288,581	54	231
	1860	203,001	262	.....	13,611,328	1,104,300	.....	208
	1850	64,339	211	.....	3,633,750	400,283	.....	177
	1900	753,632	430	304,017,106	82,363,315	3,575,642	596	403
Iowa	1890	593,908	456	182,968,973	48,677,504	4,292,170	115	308
	1880	275,545	353	a 1,504,407	19,244,835	985,329	27	216
	1870	121,467	276	b 208,130	9,522,010	271,477	2	239
	1860	40,344	235	.....	2,957,673	199,314	.....	226
	1850	607	101	.....	1,100	.....	.....	5
Missouri	1900	1,423,648	638	535,872,240	139,022,552	4,549,065	907	376
	1890	1,498,418	784	486,961,411	126,036,219	5,743,934	500	325
	1880	854,187	526	a 15,965,612	61,665,071	3,852,801	244	215
	1870	369,811	310	b 688,800	27,512,179	1,344,647	14	229
	1860	189,802	281	.....	11,953,666	918,635	.....	195
North Dakota ...	1850	45,704	238	.....	2,171,188	209,840	.....	148
	1900	765,386	246	258,207,755	46,949,726	1,396,190	115	337
	1890	851,076	318	193,931,103	44,638,168	1,673,017	68	228
	1880	661,405	305	a 3,173,017	28,712,988	873,549	30	135
	1870	398,515	232	b 857,704	14,455,825	213,865	1	112
South Dakota ...	1860	345,243	292	.....	12,704,837	259,633	.....	111
	1850	230,169	337	.....	7,834,359	203,572	.....	108
	1900	125,503	393	48,845,280	9,642,003	296,280	21	389
	1890	88,289	482	26,566,112	6,158,862	180,374	10	301
	1900	270,634	674	99,244,975	23,573,077	557,642	138	367
	1890	210,240	639	59,666,525	13,659,757	554,763	16	284

a "Milk sold or sent to butter and cheese factories, gallons," census, 1880.

b "Milk sold from farms, gallons," census, 1870.

TABLE XII.—*Progress of dairying in the United States, 1850 to 1900—Continued.*

States and Territories.	Year of census.	Dairy cows on farms.		Milk product reported.	Butter, total made.	Cheese, total made.	Creameries and cheese factories.	Milk, average yield per cow.
		Total number.	Per 1,000 persons.					
North Central Division—Continued.								
Dakota Territory	1880	40,572	301	Gallons. a 415, 119	Pounds. 2, 006, 755	Pounds. 40, 137	Number 4	Gallons. 159
	1870	4, 151	297	.....	209, 735	1, 850	0	152
	1860	286	57	.....	2, 170	.....	.....	23
Nebraska	1900	512, 544	481	190, 477, 911	46, 244, 839	578, 030	93	372
	1890	505, 045	477	144, 768, 263	33, 894, 861	1, 268, 449	58	287
	1880	161, 187	357	a 625, 783	9, 790, 970	554, 772	21	187
	1870	28, 940	235	b 95, 059	1, 539, 535	78, 542	5	165
	1860	6, 995	241	.....	342, 541	12, 342	.....	149
Kansas	1900	676, 456	460	244, 909, 123	59, 837, 255	2, 714, 155	171	362
	1890	741, 786	520	201, 608, 099	50, 434, 952	2, 733, 346	101	272
	1880	418, 333	420	a 1, 360, 235	21, 683, 244	1, 275, 371	48	160
	1870	123, 440	339	b 196, 662	5, 022, 758	241, 607	1	126
	1860	28, 550	267	.....	1, 093, 497	29, 045	.....	116
South Central Division								
	1900	2, 899, 236	206	973, 950, 188	186, 856, 187	654, 909	71	336
	1890	2, 829, 657	258	519, 693, 663	135, 302, 951	349, 667	22	184
	1880	2, 147, 440	241	a 6, 084, 788	74, 208, 771	276, 923	10	.....
	1870	1, 494, 434	232	b 2, 811, 323	34, 062, 404	311, 498	4	.....
	1860	1, 859, 117	.....	.....	44, 132, 365	644, 416	.....	.....
	1850	1, 356, 491	.....	.....	31, 324, 361	571, 582	.....	.....
Kentucky	1900	364, 025	170	159, 311, 527	30, 631, 044	73, 759	27	438
	1890	364, 516	196	118, 497, 289	29, 038, 406	64, 822	15	325
	1880	301, 882	183	a 2, 513, 209	18, 261, 004	58, 468	8	190
	1870	247, 615	187	b 1, 345, 779	11, 874, 978	361, 219	4	150
	1860	269, 215	233	.....	11, 716, 609	190, 400	.....	131
	1850	247, 475	252	.....	9, 947, 523	213, 954	.....	122
Tennessee	1900	321, 676	159	147, 336, 961	29, 299, 519	32, 823	13	458
	1890	345, 311	195	107, 657, 116	28, 380, 377	101, 219	4	312
	1880	303, 900	197	a 1, 006, 795	17, 889, 969	107, 740	2	180
	1870	243, 197	193	b 415, 786	9, 571, 069	142, 240	0	121
	1860	249, 514	225	.....	10, 017, 787	135, 575	.....	121
	1850	250, 456	250	.....	8, 139, 585	177, 681	.....	98
Alabama	1900	279, 263	153	95, 882, 103	19, 139, 321	46, 374	4	343
	1890	292, 088	193	55, 508, 687	14, 548, 435	6, 131	0	190
	1880	271, 443	215	a 267, 387	7, 997, 719	14, 091	0	89
	1870	170, 640	171	b 104, 657	3, 213, 753	2, 732	.....	57
	1860	230, 537	239	.....	6, 028, 478	15, 923	.....	79
	1850	227, 791	295	.....	4, 008, 811	31, 412	.....	53
Mississippi	1900	299, 318	193	97, 030, 885	18, 929, 761	28, 572	2	324
	1890	310, 159	240	50, 803, 371	12, 988, 637	4, 898	0	164
	1880	268, 178	237	a 427, 492	7, 454, 657	4, 239	0	85
	1870	173, 899	210	b 17, 062	2, 613, 521	3, 099	0	45
	1860	207, 646	263	.....	5, 006, 610	4, 427	.....	72
	1850	214, 231	353	.....	4, 346, 234	21, 191	.....	61
Louisiana	1900	184, 815	134	39, 251, 413	4, 918, 229	135, 104	0	212
	1890	167, 223	149	12, 881, 927	2, 089, 774	3, 939	0	77
	1880	146, 454	156	a 256, 241	916, 089	7, 618	0	21
	1870	102, 076	140	b 833, 928	322, 405	11, 747	0	18

a "Milk sold or sent to butter and cheese factories, gallons," census, 1880.

b "Milk sold from farms, gallons," census, 1870.

TABLE XII.—*Progress of dairying in the United States, 1850 to 1900—Continued.*

States and Territories.	Year of census.	Dairy cows on farm.		Milk product reported.	Butter, total made.	Cheese, total made.	Creameries and cheese factories.	Milk, average yield per cow.
		Total number.	Per 1,000 persons.					
South Central Division—Continued.				Gallons.	Pounds.	Pounds.	Number	Gallons.
Louisiana	1860	129,662	183	.....	1,444,742	6,153	.....	34
	1850	105,576	204	.....	683,069	1,957	.....	19
Texas	1900	861,023	282	251,342,698	48,244,206	194,423	12	292
	1890	1,003,439	449	118,475,320	32,145,249	145,730	3	118
	1880	606,176	381	a 1,296,806	13,899,320	58,466	0	71
	1870	428,048	523	b 62,771	3,712,747	34,342	0	26
	1860	601,540	996	.....	5,850,583	275,128	.....	30
	1850	217,811	1,023	.....	2,344,900	95,299	.....	33
Oklahoma	1900	165,852	416	47,439,853	8,834,559	111,642	5	286
	1890	16,756	270	1,544,280	387,920	1,600	0	92
Indian Territory.	1900	110,687	282	26,493,855	5,105,715	1,227	.....	239
Arkansas	1900	312,577	238	109,861,393	21,753,833	30,985	8	351
	1890	330,165	293	54,325,673	15,724,144	21,328	0	165
	1880	249,407	311	a 316,858	7,790,013	26,301	0	95
	1870	128,959	266	b 31,350	2,753,931	2,119	.....	64
	1860	171,003	393	.....	4,067,556	16,810	.....	72
	1850	93,151	444	.....	1,854,239	30,088	.....	60
Western Division....	1900	866,528	212	362,467,850	75,152,860	14,932,061	444	418
	1890	720,767	238	202,549,207	44,166,290	6,519,870	52	281
	1880	422,093	239	a 13,804,068	23,296,799	4,806,063	268	.....
	1870	312,775	316	b 4,043,087	11,144,030	3,666,907	3	.....
	1860	315,520	.....	.....	4,585,289	1,551,785	.....	.....
	1850	29,203	.....	.....	295,589	73,976	.....	.....
Montana	1900	45,036	185	15,696,214	2,488,310	30,924	3	349
	1890	24,143	183	6,038,096	1,062,185	11,512	1	250
	1880	11,308	290	a 41,165	412,738	80,070	3	117
	1870	12,432	592	b 105,186	408,080	27,603	1	109
Wyoming	1900	18,272	197	5,121,974	918,054	25,327	2	280
	1890	11,684	192	3,064,588	428,269	15,196	1	262
	1880	3,730	178	a 75,343	105,643	2,930	0	106
	1870	707	79	b 4,980	1,200	.....	0	12
Colorado	1900	100,116	186	38,440,111	6,499,121	1,568,441	38	384
	1890	76,948	187	19,680,791	3,621,086	131,683	6	256
	1880	28,770	148	a 506,706	862,479	75,367	2	108
	1870	25,017	625	b 19,520	392,920	37,626	1	50
New Mexico.....	1900	16,775	86	3,009,657	313,003	68,571	0	179
	1890	18,507	120	717,155	860,042	18,931	0	39
	1880	12,955	108	a 10,036	44,827	10,501	0	12
	1870	16,417	178	b 813	12,912	27,239	0	4
	1860	34,369	366	.....	13,259	37,240	.....	2
	1850	10,635	172	.....	111	5,848	.....	1
Arizona	1900	17,965	146	3,056,109	803,394	407,057	7	170
	1890	4,874	81	709,225	115,203	10,855	0	146
	1880	9,156	229	a 42,618	62,217	62,217	2	27
	1870	938	94	b 4,800	800	14,500	0	26
Utah	1900	65,905	238	25,124,642	5,331,336	2,043,430	57	381
	1890	45,982	221	8,614,694	1,815,154	176,739	3	187
	1880	32,768	228	a 155,263	1,064,923	266,749	11	106

a "Milk sold or sent to butter and cheese factories, gallons," census 1880.

b "Milk sold from farms, gallons," census 1870.

TABLE XII.—*Progress of dairying in the United States, 1850 to 1900—Continued.*

States and Territories.	Year of census.	Dairy cows on farm.		Milk product reported.	Butter, total made.	Cheese, total made.	Creameries and cheese factories.	Milk, average yield per cow.
		Total number.	Per 1,000 persons.					
Western division—Continued.				Gallons.	Pounds.	Pounds.	Number	Gallons.
Utah	1870	17,563	202	a 11,240	310,335	69,603	0	58
	1860	11,967	299	.....	316,046	53,331	.....	84
	1850	4,861	442	.....	83,309	30,998	.....	59
Nevada.....	1900	13,606	321	4,446,071	1,192,925	174,232	4	327
	1890	9,273	202	2,532,052	489,657	51,207	1	273
	1880	13,319	215	b 149,889	338,688	17,420	2	88
	1870	6,174	147	a 63,850	110,880	.....	0	64
	1860	947	135	.....	7,700	.....	.....	24
Idaho	1900	51,929	321	15,122,948	2,952,886	391,332	19	291
	1890	27,278	325	5,085,863	1,091,753	323,853	4	186
	1880	12,838	389	b 15,627	314,244	117,295	6	76
	1870	4,171	278	a 11,250	111,480	4,464	0	84
Washington	1900	107,232	207	50,182,415	10,570,527	1,633,796	60	468
	1890	70,721	203	19,873,281	3,483,725	320,981	3	281
	1880	27,622	368	b 226,703	1,404,066	179,200	2	160
	1870	16,938	706	a 21,060	407,306	17,465	0	75
	1860	9,660	805	.....	153,092	12,146	.....	49
Oregon	1900	122,447	296	48,582,968	10,082,807	1,662,820	68	397
	1890	114,156	363	25,042,276	4,924,745	496,116	12	219
	1880	59,549	340	b 227,540	2,528,225	299,732	24	130
	1870	48,325	531	a 107,367	1,418,373	119,383	1	92
	1860	53,170	1,022	.....	1,000,157	105,379	.....	59
	1850	9,427	725	.....	211,464	36,980	.....	72
California	1900	307,245	207	153,684,741	34,000,497	6,926,131	186	500
	1890	317,201	263	111,191,186	27,048,471	4,962,797	21	351
	1880	210,078	243	b 12,353,178	16,158,749	3,720,739	216	274
	1870	164,093	293	a 3,693,021	7,969,744	3,395,074	0	192
	1860	205,407	541	.....	3,095,035	1,343,689	.....	53
	1850	4,280	46	.....	705	150	.....	1

a "Milk sold from farms, gallons," census 1870.

b "Milk sold or sent to butter and cheese factories, gallons," census 1880.

NOTE.—Table XII is taken entire from census reports excepting the last column. In that the figures for 1890 and 1900 are computed from the census, and those for the other years are quoted from reports of the Department of Agriculture.

The column of "average milk yield per cow" shows an increase, decade after decade, which indicates a rapid improvement in cows. But these figures are misleading, because their basis varies for different years. In the earlier censuses the milk yield was not reported. For 1850 and 1860 only the butter and cheese made on farms were given, and the average milk yield per cow estimated erroneously by reducing the reported products to an equivalent in milk and dividing by the number of cows. The cows were thus credited with only such milk as was made into butter and cheese. For 1870 and 1880 the same plan was followed, but milk sold being also reported, this was added to that manufactured on farms; the large quantity of milk consumed on farms was still omitted from the computation. For 1890 the census reported the total milk product for the first time; this being directly divided by the number of producing cows, apparently gives the annual average yield per cow. This subject is discussed on page 17.

TABLE XIII.—*Dairying in the United States for 1900.*^a

[Includes estimated product from 973,033 cows not on farms and ranges, and butter and cheese made at urban establishments.]

States and Territories.	Dairy cows in United States.		Milk product reported plus estimated milk.	Total butter made.	Total cheese made.
	Total number.	Per 1,000 persons.			
			Gallons.	Pounds.	Pounds.
The United States	18, 112, 707	237	7, 728, 583, 349	1, 492, 699, 143	299, 006, 818
North Atlantic Division.....	3, 665, 685	174	1, 907, 821, 498	326, 296, 206	148, 627, 434
Maine	185, 548	267	105, 265, 288	20, 635, 572	979, 048
New Hampshire.....	118, 751	289	62, 489, 215	11, 419, 881	221, 080
Vermont	276, 592	805	145, 081, 273	41, 288, 087	5, 119, 764
Massachusetts.....	199, 452	71	112, 644, 623	9, 593, 272	270, 171
Rhode Island.....	25, 027	58	13, 572, 837	636, 281	6, 751
Connecticut.....	132, 521	146	71, 843, 187	8, 501, 285	361, 886
New York	1, 587, 921	212	790, 048, 027	115, 606, 980	130, 419, 747
New Jersey.....	167, 799	89	82, 650, 255	7, 219, 882	124, 377
Pennsylvania	1, 022, 074	162	524, 226, 793	111, 394, 966	11, 124, 610
South Atlantic Division	1, 476, 787	141	536, 535, 765	92, 909, 203	593, 308
Delaware.....	33, 645	182	13, 181, 918	2, 599, 838	15, 104
Maryland	157, 566	133	68, 924, 467	11, 643, 178	338, 458
District of Columbia.....	1, 809	6	1, 115, 399	3, 478	.....
Virginia.....	301, 905	163	114, 582, 203	20, 076, 351	88, 697
West Virginia	217, 538	227	89, 531, 735	16, 975, 220	115, 103
North Carolina.....	246, 755	130	95, 974, 824	16, 913, 802	28, 883
South Carolina.....	136, 333	102	48, 614, 803	8, 150, 437	1, 081
Georgia.....	296, 962	134	92, 384, 082	15, 160, 454	2, 236
Florida.....	84, 274	159	12, 226, 334	1, 386, 445	3, 751
North Central Division.....	8, 927, 882	339	3, 817, 759, 378	811, 071, 893	134, 199, 094
Ohio.....	868, 832	209	449, 902, 069	87, 668, 620	19, 323, 528
Indiana	611, 772	243	281, 267, 839	54, 616, 974	1, 438, 901
Illinois.....	1, 064, 491	221	484, 099, 820	86, 600, 162	9, 381, 904
Michigan.....	601, 844	249	327, 638, 071	67, 901, 440	10, 756, 758
Wisconsin.....	1, 032, 811	499	488, 620, 914	106, 573, 740	79, 384, 298
Minnesota.....	789, 683	451	321, 141, 331	82, 363, 315	3, 575, 642
Iowa.....	1, 479, 676	663	562, 485, 540	139, 022, 552	4, 549, 065
Missouri.....	814, 578	262	281, 573, 955	47, 027, 916	1, 642, 891
North Dakota	131, 119	411	51, 512, 880	9, 642, 003	296, 280
South Dakota	280, 024	697	103, 705, 225	23, 573, 077	557, 642
Nebraska.....	538, 856	505	202, 976, 111	46, 244, 839	578, 030
Kansas.....	714, 196	486	262, 835, 623	59, 837, 255	2, 714, 155
South Central Division.....	3, 103, 169	220	1, 070, 818, 363	186, 984, 274	654, 909
Kentucky	387, 608	181	170, 513, 452	30, 738, 040	73, 759
Tennessee.....	351, 949	174	161, 716, 636	29, 320, 610	32, 823
Alabama	302, 129	165	106, 743, 453	19, 139, 321	46, 374
Mississippi.....	316, 217	204	105, 057, 410	18, 929, 761	28, 572
Louisiana	197, 264	143	45, 164, 688	4, 918, 229	135, 104
Texas	924, 899	303	281, 683, 798	48, 214, 206	194, 423
Oklahoma.....	169, 613	426	49, 226, 328	8, 834, 559	111, 642
Indian Territory	119, 362	304	30, 614, 480	5, 105, 715	1, 227
Arkansas.....	334, 128	255	120, 098, 118	21, 753, 833	30, 985

^a Table XIII gives the aggregate of dairy cows and their products, by States and by groups of States, for the year 1900, and is the only table thus showing the aggregate dairy product of the country, because it includes all the cows, whether on farms or elsewhere, and the products of dairy establishments of every description, as well as of farms.

TABLE XIII.—*Dairying in the United States for 1900*—Continued.

States and Territories.	Dairy cows in United States.		Milk product reported plus estimated milk.	Total butter made.	Total cheese made.
	Total number.	Per 1,000 persons.			
			<i>Gallons.</i>	<i>Pounds.</i>	<i>Pounds.</i>
Western Division.....	935,143	229	395,059,975	75,312,496	14,932,061
Montana	48,317	199	17,254,689	2,488,310	30,924
Wyoming	19,923	215	5,906,199	918,054	25,327
Colorado	108,697	201	42,516,086	6,499,121	1,568,441
New Mexico.....	18,120	93	3,648,532	313,003	68,571
Arizona	18,638	152	3,375,784	803,394	407,057
Utah	74,284	268	29,104,667	5,331,336	2,043,430
Nevada	14,178	335	4,717,771	1,192,925	174,232
Idaho	54,520	337	16,353,673	2,952,886	391,332
Washington	119,041	230	55,791,690	10,570,527	1,633,796
Oregon	132,669	321	53,438,418	10,082,807	1,662,820
California	326,756	220	162,952,466	34,166,133	6,926,131
Alaska	13	.....	4,250	200	12
Hawaii	4,028	26	584,120	118,871	

TABLE XIV.—*Butter, cheese, and condensed-milk factories, including all "creameries" and urban dairy establishments.*

[From the census of the United States for 1900, 1890, 1880, 1870.]

Totals for the United States.	1900. ^a	1890. ^a	1880.	1870.
Number of establishments reporting	9,355	4,712	3,932	1,313
Capital employed, aggregate.....dollars..	36,508,015	16,624,163	9,604,803	3,690,075
Plant, total value.....do.....	27,301,990	12,089,572	.....	.....
Land.....do.....	1,848,394	1,114,025	.....	.....
Buildings.....do.....	11,556,444	5,738,406	.....	.....
Machinery.....do.....	13,897,152	5,237,141	.....	.....
Live assets.....do.....	9,206,025	4,534,591	.....	.....
Expenses, total amount.....do.....	1,590,766	875,182	.....	.....
Employees.....average number..	^b 15,693	14,921	7,903	4,607
Total wages paid.....dollars..	7,086,112	5,390,705	1,546,495	706,566
Materials used:				
Aggregate cost.....dollars..	109,151,205	51,364,574	18,363,579	14,089,284
For butter—				
Gathered cream.....pounds..	204,740,714	483,630,741	.....	.....
Milk.....do.....	8,534,911,412	1,893,319,242	.....	.....
Total cost.....dollars..	75,732,159	29,538,827	4,644,214	.....
For cheese—				
Milk.....pounds..	2,749,313,613	2,684,550,517	.....	.....
Total cost.....dollars..	22,007,515	16,953,992	12,692,507	14,089,284
For condensed milk—				
Milk.....pounds..	421,378,073	83,617,655	.....	.....
Sugar.....do.....	50,873,859	13,372,365	.....	.....
Total cost.....dollars..	8,907,021	2,792,086	1,026,858	.....
Fuel, cost.....do.....	1,712,612	.....	.....	.....
Rented power and heat.....do.....	18,667	.....	.....	.....
Mill supplies.....do.....	249,938	.....	.....	.....
Freight.....do.....	523,833	.....	.....	.....

^aIncludes urban establishments. See p. 28.^bIn addition to 7,104 proprietors and firm members.

TABLE XIV.—*Butter, cheese, and condensed-milk factories, etc.*—Continued.

Totals for the United States.	1900.	1890.	1880.	1870.
Products:				
Aggregate value.....dollars..	131, 199, 277	62, 686, 043	25, 815, 963	16, 771, 665
Butter, packed solid—				
Quantity.....pounds..	329, 291, 178			
Value.....dollars..	64, 034, 253			
Butter, prints or rolls—				
Quantity.....pounds..	91, 662, 838			
Value.....dollars..	20, 241, 163			
Butter, total made—				
Quantity.....pounds..	420, 954, 016	181, 284, 916	29, 421, 784	
Value.....dollars..	84, 275, 416	36, 675, 411	6, 535, 799	
Cream sold—				
Quantity.....gallons..	7, 884, 683			
Value.....dollars..	4, 547, 536			
Cheese, standard factory—				
Quantity.....pounds..	226, 136, 555	184, 158, 174		
Value.....dollars..	21, 399, 527	16, 112, 871		
Cheese, all other made—				
Quantity.....pounds..	56, 497, 933	53, 876, 891		
Value.....dollars..	5, 170, 953	3, 690, 080		
Cheese, total made—				
Quantity.....pounds..	282, 634, 488	238, 035, 065	215, 885, 361	109, 435, 229
Value.....dollars..	26, 570, 480	19, 802, 951	17, 659, 123	16, 710, 569
Condensed milk—				
Quantity.....pounds..	186, 921, 787	37, 926, 821	13, 033, 267	
Value.....dollars..	11, 888, 792	3, 586, 927	1, 547, 588	
Skim milk, value.....do.....	2, 555, 468			
Dried casein.....do.....	384, 291	570, 416	73, 453	61, 096
All other products.....do.....	977, 294			

NOTE.—In this table the figures in the column for 1870 relate to cheese factories, no other product being reported. The column for 1880 requires no explanation except that at this time butter factories or creameries had become numerous, although their product was but little more than one-third in value of the factory cheese produced.

For 1890 it should be noted that the figures are from the "number of establishments reporting." It is known that, in fact, there were many more creameries in operation in the country in 1889-90 than the number reported in the table. The aggregate products of factory-made butter and cheese thus shown must be considerably less than the actual output of existing factories. The census returns of total dairy products of the United States for 1889 must, therefore, be below the actual facts.

This table, although thus incomplete, shows the rapid growth of the cooperative or factory system of dairying. Farm cheese making has practically disappeared since the advent of cheese factories and creameries, and the proportion of factory-made butter is fast increasing, although the quantity of butter made on farms is increasing also.

In 1900 the number of creameries, etc., for New York was 1,928; this allows one for every 25 square miles in the State. These factories thus averaged but 5 miles apart, giving the longest average drive for their patrons as about 3 miles.

Wisconsin reported 2,019 creameries and cheese factories, or one for every 27 square miles; Vermont, one for every 36 square miles; Iowa, one for every 61 square miles, and Pennsylvania, one for every 60 square miles.

In connection with this table, attention is called to the Plates II, III, and IV.

TABLE XV.—*Number and value of milch cows in the United States, and of other farm animals, yearly, 1870 to 1903, inclusive, with a few earlier years.*

[From the Annual Reports of the Department of Agriculture.]

Year.	Milch cows.		Oxen and other cattle.		Horses.		Total value of farm animals.
Jan. 1—	Number.	Value.	Number.	Value.	Number.	Value.	
1840....	4, 837, 043	\$72, 555, 000	10, 171, 586	.....	4, 335, 669	.....	.....
1850....	6, 385, 094	127, 840, 880	11, 393, 813	.....	4, 336, 719	.....	\$544, 180, 516
1860....	8, 585, 735	264, 643, 375	17, 034, 284	.....	6, 249, 174	.....	1, 089, 329, 915
1870....	10, 095, 600	394, 940, 745	15, 388, 500	\$346, 926, 440	8, 248, 800	\$671, 319, 461	1, 822, 327, 377
1871....	10, 023, 000	374, 179, 093	16, 212, 200	369, 940, 056	8, 702, 000	683, 257, 587	1, 810, 142, 711
1872....	10, 303, 500	329, 408, 983	16, 389, 800	321, 562, 693	8, 990, 900	659, 707, 916	1, 659, 211, 933
1873....	10, 575, 900	314, 358, 931	16, 413, 800	329, 298, 755	9, 222, 470	684, 463, 957	1, 684, 431, 693
1874....	10, 705, 300	299, 609, 309	16, 218, 100	310, 649, 803	9, 333, 800	666, 927, 406	1, 619, 944, 472
1875....	10, 906, 800	311, 089, 824	16, 313, 400	304, 858, 859	9, 504, 200	646, 370, 939	1, 618, 012, 221
1876....	11, 085, 400	320, 346, 728	16, 785, 300	319, 623, 509	9, 735, 300	632, 446, 985	1, 647, 719, 138
1877....	11, 260, 800	307, 743, 211	17, 956, 100	307, 105, 386	10, 155, 400	610, 206, 631	1, 576, 506, 083
1878....	11, 300, 100	298, 499, 866	19, 223, 300	329, 541, 703	10, 329, 700	600, 813, 681	1, 574, 620, 783
1879....	11, 826, 400	256, 953, 928	21, 408, 100	329, 543, 327	10, 938, 700	573, 254, 808	1, 445, 423, 062
1880....	12, 027, 000	279, 899, 420	21, 231, 000	341, 761, 154	11, 201, 800	613, 296, 611	1, 576, 917, 556
1881....	12, 368, 653	296, 277, 060	20, 938, 710	362, 861, 509	11, 429, 626	667, 954, 325	1, 721, 795, 252
1882....	12, 611, 632	326, 489, 310	23, 280, 238	463, 069, 501	10, 521, 554	615, 824, 914	1, 906, 468, 252
1883....	13, 125, 685	396, 575, 405	28, 046, 077	611, 549, 109	10, 838, 110	765, 041, 308	2, 338, 215, 768
1884....	13, 501, 206	423, 486, 649	29, 046, 101	683, 229, 054	11, 169, 683	833, 734, 400	2, 467, 868, 924
1885....	13, 904, 722	412, 903, 093	29, 866, 573	694, 382, 913	11, 564, 572	852, 282, 947	2, 456, 428, 383
1886....	14, 235, 388	389, 985, 523	31, 275, 242	661, 956, 274	12, 077, 657	860, 823, 208	2, 365, 159, 862
1887....	14, 522, 083	378, 789, 589	33, 511, 750	663, 137, 926	12, 496, 744	901, 685, 755	2, 400, 586, 938
1888....	14, 856, 414	366, 252, 173	34, 378, 363	611, 750, 520	13, 172, 936	946, 096, 154	2, 409, 043, 418
1889....	15, 298, 625	366, 226, 376	35, 032, 417	597, 236, 812	13, 663, 294	982, 194, 827	2, 507, 050, 058
1890....	15, 952, 883	353, 152, 133	36, 849, 024	560, 625, 137	14, 213, 837	978, 516, 562	2, 418, 766, 028
1891....	16, 019, 591	346, 397, 900	36, 875, 648	544, 127, 908	14, 056, 750	941, 823, 222	2, 329, 787, 770
1892....	16, 416, 351	351, 378, 132	37, 651, 239	570, 749, 155	15, 498, 140	1, 007, 593, 636	2, 461, 755, 698
1893....	16, 424, 087	357, 299, 785	35, 954, 196	547, 882, 204	16, 206, 802	992, 225, 185	2, 483, 506, 681
1894....	16, 487, 400	358, 998, 661	36, 608, 168	536, 789, 747	16, 081, 139	769, 224, 799	2, 170, 816, 754
1895....	16, 504, 629	362, 601, 729	34, 364, 216	482, 999, 129	15, 893, 318	576, 730, 580	1, 819, 446, 306
1896....	16, 137, 586	363, 955, 545	32, 085, 409	508, 928, 416	15, 124, 057	500, 140, 186	1, 727, 926, 084
1897....	15, 941, 727	369, 239, 993	30, 508, 408	507, 929, 421	14, 364, 667	452, 649, 396	1, 655, 414, 612
1898....	15, 840, 886	434, 813, 826	29, 264, 197	612, 296, 634	13, 960, 911	478, 362, 407	1, 891, 577, 471
1899....	15, 990, 115	474, 233, 925	27, 994, 225	637, 931, 135	13, 665, 307	511, 074, 813	1, 907, 010, 407
1900....	16, 292, 360	514, 812, 106	27, 610, 054	689, 486, 260	13, 537, 524	603, 969, 442	2, 042, 650, 813
1901....	16, 833, 657	505, 093, 077	45, 500, 213	906, 644, 003	16, 744, 723	885, 200, 168	3, 011, 254, 076
1902....	16, 696, 802	488, 130, 324	44, 727, 797	839, 126, 073	16, 531, 224	968, 935, 178	2, 989, 170, 150
1903....	17, 105, 227	516, 711, 914	44, 659, 206	824, 054, 902	16, 557, 373	1, 030, 705, 959	3, 102, 515, 540

a Exclusive of hogs.

NOTE.—Some of the figures above agree exactly with those of the census for the corresponding year. In other cases, for census years, the numbers of animals as reported by the Department differ somewhat from those of the census.

These numbers are understood to represent only animals on farms.

The values from 1870 to 1878 were currency values; those for 1880 and later were on gold basis.

TABLE XVI.—*Farm statistics by States.*

[From the Twelfth United States Census, 1900.]

States and Territories.	Popula- tion.	Persons "in agri- culture."	Farms.	Average size of farms.	Dairy cows on farms and ranges.	All other neat cattle over 1 year.
		Number.	Number.	Acres.	Number.	Number.
The United States.....	76,303,387	10,438,219	5,739,657	147	17,139,674	35,349,563
North Atlantic Division.....	21,046,695	1,074,412	677,506	96	3,496,266	1,585,350
Maine.....	694,466	76,923	59,299	106	173,592	103,461
New Hampshire.....	411,588	38,782	29,324	123	115,036	71,332
Vermont.....	343,641	49,820	33,104	143	270,194	130,162
Massachusetts.....	2,805,346	66,551	37,715	83	184,562	57,761
Rhode Island.....	428,556	10,957	5,498	83	23,660	7,036
Connecticut.....	908,420	44,796	26,948	86	126,434	53,324
New York.....	7,268,894	375,990	226,720	100	1,501,608	587,641
New Jersey.....	1,883,669	68,881	34,650	82	157,407	42,892
Pennsylvania.....	6,302,115	341,712	224,248	86	943,773	531,751
South Atlantic Division.....	10,443,480	2,032,569	962,225	108	1,383,319	2,106,982
Delaware.....	184,735	19,002	9,687	110	32,591	12,226
Maryland.....	1,188,044	95,554	46,012	112	147,284	89,897
District of Columbia.....	278,718	1,488	269	32	1,251	142
Virginia.....	1,854,184	300,268	167,886	119	281,876	381,583
West Virginia.....	958,800	151,722	92,874	115	205,601	300,074
North Carolina.....	1,893,810	459,306	224,637	101	233,178	248,654
South Carolina.....	1,340,316	393,693	155,355	90	126,684	128,480
Georgia.....	2,216,331	522,848	224,691	118	276,024	411,888
Florida.....	528,542	88,688	40,814	107	78,830	534,038
North Central Division.....	26,333,004	3,508,808	2,196,567	144	8,490,284	14,819,176
Ohio.....	4,157,545	414,562	276,719	88	818,239	740,490
Indiana.....	2,516,462	342,733	221,897	97	574,276	682,093
Illinois.....	4,821,550	462,781	264,151	124	1,007,664	1,373,024
Michigan.....	2,420,982	312,462	203,261	86	563,905	437,021
Wisconsin.....	2,069,042	270,007	169,795	117	998,397	692,365
Minnesota.....	1,751,394	258,944	154,659	170	753,632	551,699
Iowa.....	2,231,853	371,604	228,622	151	1,423,648	2,658,703
Missouri.....	3,106,665	463,293	284,886	119	765,386	1,579,886
North Dakota.....	319,146	71,626	45,332	343	125,503	375,511
South Dakota.....	401,570	82,857	52,622	362	270,634	933,025
Nebraska.....	1,066,300	186,587	121,525	246	512,544	1,909,199
Kansas.....	1,470,495	271,252	173,098	241	676,456	2,891,160
South Central Division.....	14,080,047	3,300,817	1,658,166	155	2,899,236	10,924,148
Kentucky.....	2,147,174	408,185	234,667	94	364,025	468,721
Tennessee.....	2,020,616	413,406	224,623	91	321,676	354,507
Alabama.....	1,828,697	515,737	223,220	93	279,263	307,074
Mississippi.....	1,551,270	490,582	220,803	83	299,318	335,437
Louisiana.....	1,381,625	295,445	115,969	95	184,815	315,655
Texas.....	3,048,710	644,634	352,190	357	861,023	6,418,912
Oklahoma.....	398,331	94,931	62,495	252	165,852	1,243,775
Indian Territory.....	392,060	92,418	45,505	160	110,687	1,152,582
Arkansas.....	1,311,564	345,479	178,694	93	312,577	327,485
Western Division.....	4,091,349	466,159	242,908	386	866,528	5,832,539
Montana.....	243,329	28,693	13,370	886	45,036	735,818
Wyoming.....	92,531	13,407	6,095	1,333	18,272	542,242
Colorado.....	539,700	44,904	24,700	384	100,116	1,064,048
New Mexico.....	195,310	27,214	12,311	417	16,775	786,322

TABLE XVI.—*Farm statistics by States—Continued.*

States and Territories.	Popula- tion.	Persons "in agri- culture."	Farms.	Average size of farms.	Dairy cows on farms and ranges.	All other neat cattle over 1 year.
Western Division—Continued.		<i>Number.</i>	<i>Number.</i>	<i>Acres.</i>	<i>Number.</i>	<i>Number.</i>
Arizona	122,931	16,174	5,809	333	17,965	589,489
Utah	276,749	29,414	19,387	212	65,905	198,845
Nevada	42,335	5,890	2,184	1,175	13,606	290,525
Idaho	161,772	27,489	17,471	183	51,929	225,207
Washington	518,103	61,113	33,202	256	107,232	182,561
Oregon	413,536	58,490	35,837	281	122,447	409,533
California	1,485,053	152,371	72,542	397	307,245	807,949
Alaska	63,592	367	12	13	13	5
Hawaii	154,001	56,076	2,273	1,148	4,028	81,363

TABLE XVII.—*Population and number of cows per square mile of land surface in each State and Territory in 1900.*

States and Territories.	Popula- tion.	Cows.	States and Territories.	Popula- tion.	Cows.
United States ^a	25.62	6.10	Nebraska	13.88	7.14
Alabama	35.48	5.86	Nevada	.39	.13
Arizona	1.09	.16	New Hampshire	45.71	13.19
Arkansas	24.73	6.30	New Jersey	250.32	22.30
California	9.52	2.09	New Mexico	1.59	.15
Colorado	5.21	1.05	New York	152.64	32.30
Connecticut	187.50	27.35	North Carolina	38.98	5.08
Delaware	94.25	17.17	North Dakota	4.55	1.87
Florida	9.74	1.55	Ohio	102.00	21.31
Georgia	37.58	5.03	Oklahoma	10.26	4.37
Idaho	1.92	.65	Oregon	4.37	1.40
Illinois	86.10	19.01	Pennsylvania	140.09	22.72
Indiana	70.08	17.04	Rhode Island	406.99	23.77
Iowa	40.23	26.67	South Carolina	44.43	4.52
Kansas	18.00	8.74	South Dakota	5.23	3.64
Kentucky	53.68	9.69	Tennessee	48.40	8.43
Louisiana	30.42	4.34	Texas	11.62	3.53
Maine	23.23	6.21	Utah	3.37	.90
Maryland	120.49	15.98	Vermont	37.62	30.28
Massachusetts	348.92	24.81	Virginia	46.21	7.52
Michigan	42.16	10.48	Washington	7.75	1.78
Minnesota	22.11	9.97	West Virginia	38.90	8.83
Mississippi	33.48	6.82	Wisconsin	38.00	18.97
Missouri	45.20	11.85	Wyoming	.95	.20
Montana	1.67	.33			

^a Not including Hawaii and Alaska.

NOTE.—Plate I which is seen opposite page 48 serves to illustrate Table XVII.

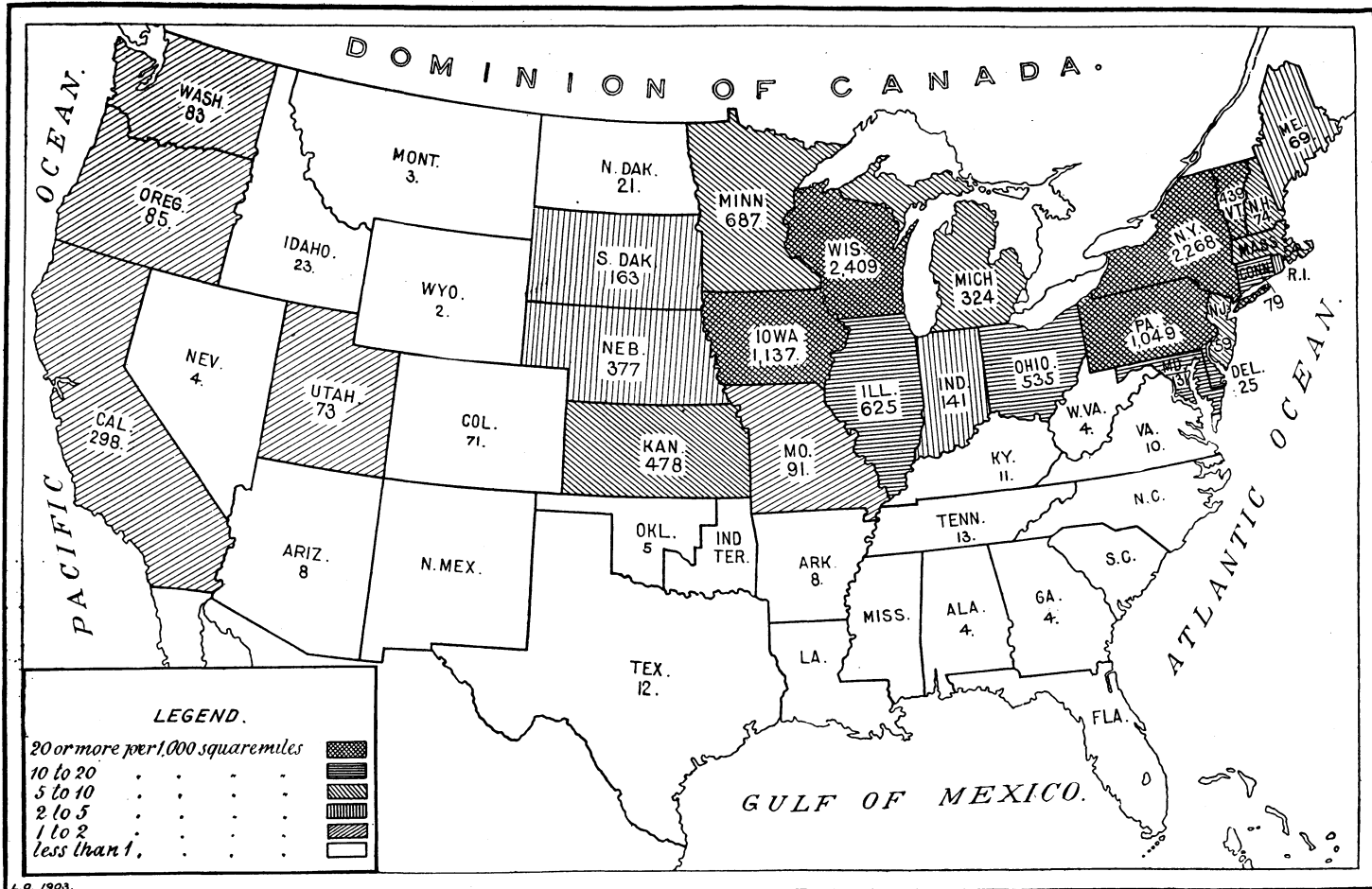


DIAGRAM SHOWING DENSITY OF ASSOCIATED DAIRYING IN THE UNITED STATES, 1900 (NUMBER OF ESTABLISHMENTS, INCLUDING CHEESE FACTORIES AND MILK CONDENSERIES, WITH THEIR SEPARATING STATIONS AND OTHER BRANCHES, BY STATES).

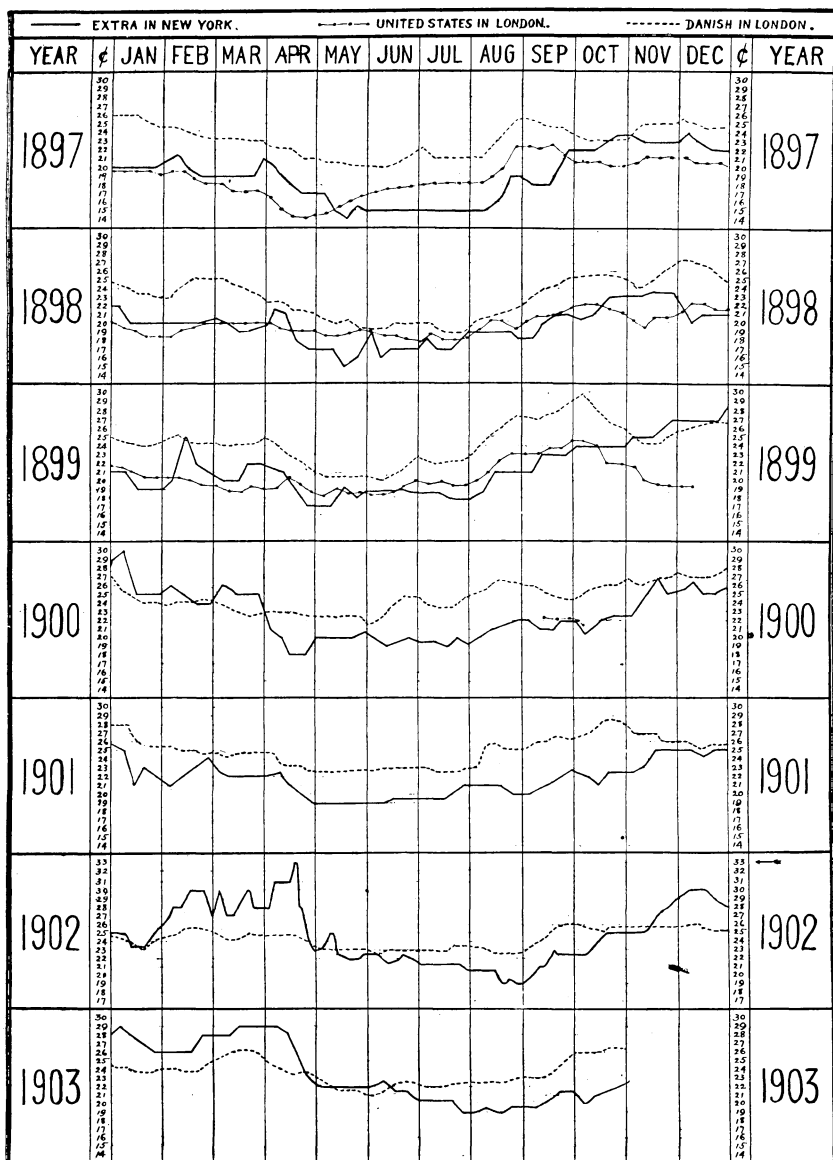


DIAGRAM SHOWING BUTTER QUOTATIONS IN NEW YORK AND LONDON.

TABLE XVIII.—*Pounds of cheese and butter produced per square mile of land surface in each State and Territory in 1900.*

States and Territories.	Cheese.	Butter.	States and Territories.	Cheese.	Butter.
United States.....	100.87	502.55	Nebraska.....	7.52	601.83
Alabama.....	0.90	371.35	Nevada.....	1.59	10.87
Arizona.....	3.60	7.11	New Hampshire.....	24.55	1,268.17
Arkansas.....	.58	410.10	New Jersey.....	16.53	959.45
California.....	44.40	219.04	New Mexico.....	.56	2.56
Colorado.....	15.13	62.71	New York.....	2,738.76	2,427.70
Connecticut.....	74.69	1,754.65	North Carolina.....	.59	348.16
Delaware.....	7.71	1,326.45	North Dakota.....	4.22	137.36
Florida.....	.07	25.56	Ohio.....	474.08	2,150.85
Georgia.....	.04	257.04	Oklahoma.....	2.88	227.52
Idaho.....	4.64	35.03	Oregon.....	17.58	106.63
Illinois.....	167.53	1,546.43	Pennsylvania.....	247.30	2,476.27
Indiana.....	40.07	1,520.94	Rhode Island.....	6.41	604.26
Iowa.....	82.00	2,506.04	South Carolina.....	.04	270.15
Kansas.....	33.22	732.40	South Dakota.....	7.26	306.74
Kentucky.....	1.84	768.45	Tennessee.....	.79	702.29
Louisiana.....	2.97	108.28	Texas.....	.74	183.93
Maine.....	32.75	690.27	Utah.....	24.86	64.87
Maryland.....	34.33	1,180.85	Vermont.....	560.46	4,519.77
Massachusetts.....	33.60	1,193.19	Virginia.....	2.22	500.35
Michigan.....	187.30	1,182.33	Washington.....	24.43	158.05
Minnesota.....	45.14	1,039.88	West Virginia.....	4.67	688.79
Mississippi.....	.62	408.50	Wisconsin.....	1,457.93	1,957.28
Missouri.....	23.90	684.19	Wyoming.....	.26	9.41
Montana.....	.21	17.12			

TABLE XIX.—*Rank of each State and Territory in 1900 in regard to various matters—Continued.*

[United States Census.]

States and Territories.	Land area.	Population.	Persons in agriculture.	Number of cows.	Milk produced.	Butter produced.	Cheese produced.	Persons per square mile.	Cows per square mile.	Butter per square mile.	Cheese per square mile.
Alabama.....	26	18	3	19	21	22	37	25	28	28	37
Arizona.....	5	46	45	46	48	46	21	46	46	47	31
Arkansas.....	25	25	14	16	18	19	39	28	26	26	42
California.....	2	21	24	17	15	15	7	36	36	34	11
Colorado.....	7	31	37	38	38	37	15	39	41	41	23
Connecticut.....	46	29	38	34	29	34	23	4	3	7	9
Delaware.....	47	44	44	43	43	41	44	9	12	10	24
Florida.....	24	32	28	39	44	43	46	35	31	43	46
Georgia.....	19	11	2	21	26	26	47	24	30	32	47
Idaho.....	10	45	42	41	41	40	22	43	43	42	29
Illinois.....	21	3	6	3	5	6	6	10	10	8	7
Indiana.....	37	8	15	11	11	10	16	11	13	9	12
Iowa.....	22	10	13	2	2	1	9	19	4	2	8
Kansas.....	12	22	20	10	12	9	11	31	21	18	15
Kentucky.....	35	12	10	14	14	16	35	12	19	17	35
Louisiana.....	30	23	19	27	37	39	30	27	33	38	32

TABLE XIX.—*Rank of each State and Territory in 1900 in regard to various matters—Continued.*

States and Territories.	Land area.	Population.	Persons in agri- culture.	Number of cows.	Milk produced.	Butter produced.	Cheese produced.	Persons per square mile.	Cows per square mile.	Butter per square mile.	Cheese per square mile.
Maine	39	30	30	28	22	20	18	29	27	20	16
Maryland	41	26	26	31	30	27	24	7	14	14	13
Massachusetts	44	7	33	26	20	32	26	2	5	12	14
Michigan	20	9	17	12	7	8	5	18	17	13	6
Minnesota	13	19	22	9	8	7	10	30	18	15	10
Mississippi	29	20	4	18	23	23	42	26	25	27	40
Missouri	17	5	5	8	10	12	17	16	16	22	20
Montana	3	42	41	42	40	42	40	44	44	44	45
Nebraska	15	27	23	13	13	13	19	32	24	24	25
Nevada	6	48	48	48	46	44	29	48	48	45	36
New Hampshire	43	36	39	37	31	28	27	15	15	11	18
New Jersey	45	16	32	30	28	36	31	3	8	16	22
New Mexico	4	43	43	47	47	48	36	45	47	48	43
New York	28	1	12	1	1	2	1	5	1	4	1
North Carolina	27	15	7	24	25	25	41	20	29	29	41
North Dakota	16	40	31	35	34	31	25	40	37	37	30
Ohio	33	4	8	7	6	5	3	8	9	5	4
Oklahoma	36	38	27	29	35	33	33	34	32	33	33
Oregon	9	35	35	33	33	30	13	41	40	39	21
Pennsylvania	31	2	16	5	3	3	4	6	7	3	5
Rhode Island	48	34	47	44	42	47	45	1	6	23	27
South Carolina	38	24	11	32	36	35	48	17	31	31	48
South Dakota	14	37	29	22	24	18	20	38	34	30	26
Tennessee	32	14	9	15	16	17	38	13	22	19	38
Texas	1	6	1	6	9	11	28	33	35	35	39
Utah	11	41	40	40	39	38	12	42	42	40	17
Vermont	42	39	36	23	17	14	8	23	2	1	3
Virginia	34	17	18	20	19	21	34	14	23	25	34
Washington	18	33	34	36	32	29	14	37	38	36	19
West Virginia	40	28	25	25	27	24	32	21	20	21	28
Wisconsin	23	13	21	4	4	4	2	22	11	6	2
Wyoming	8	47	46	45	45	45	43	47	45	46	44

NOTE.—The above table is based on data in Tables XIII, XVI, XVII, and XVIII. The first three columns show the rank of each State and Territory in size, total population, and agricultural population. The next two columns show their rank in the total number of cows and total milk production. It will be seen that in almost every case where dairying is extensively practiced a State ranks higher in total milk production than number of cows, showing the superior class of stock. The sixth and seventh columns show the rank in the total production of butter and cheese. The last four columns show intensity, and are more interesting in some respects than any of the others. One's opinion of the condition of dairying in any State is often formed by the total production, which depends largely on the size of the State. But some of the small States may have a much higher development of their dairy industry and produce more per square mile than large ones that produce a large total, as is shown in Table XVIII. The ranks of the States and Territories in regard to production per square mile are given in the last two columns.

TABLE XX.—Average value of a cow in the United States for the years stated.

[United States Census and Department of Agriculture.]

Year.	Value.	Year.	Value.
January 1—		January 1—	
1850	\$20.02	1897	\$23.16
1860	30.82	1898	27.45
1870	^a 32.74	1899	29.66
1880	23.27	1900	31.60
1885	29.70	1901 ^b	29.68
1890	22.14	1902	29.23
1895	21.97	1903	30.21
1896	22.55		

^a On gold basis.^b Census June 1, 1900.

TABLE XXI.—Registered or pedigreed cattle of selected breeds in the United States and their values (estimates furnished by the secretaries of the respective breeders' associations).

[From Report for 1885, United States Department of Agriculture.]

Breed.	Number registered.	Number living.	Average value.	Total value.
Aberdeen Angus .....	.....	3,500	\$300	\$1,050,000
Ayrshire	12,867	6,483	100	643,300
Devon	10,187	8,000	81	648,000
Guernsey	4,947	3,100	149	461,000
Hereford .....	.....	14,000	300	4,200,000
Holstein-Friesian	21,138	20,081	200	4,016,200
Jersey	51,000	.....	.....	.....

[For the year 1895, as reported to the Dairy Division.]

Ayrshire	18,750	9,375	\$100	\$937,500
Brown-Swiss	1,930	1,200	150	180,000
Devon	17,007	14,500	81	1,174,500
Dutch-Belted	971	720	200	144,000
Guernsey	12,547	8,500	165	1,402,500
Holstein-Friesian	90,325	70,000	100	7,000,000
Jersey	150,000	100,000	100	10,000,000
"Maine State" Jersey	3,927	2,800	55	154,000
Red Polled	4,408	3,000	80	240,000

[For the year 1903, as reported to the Dairy Division.]

Ayrshire	25,541	8,500	\$100	\$850,000
Brown-Swiss	3,258	1,800	75	135,000
Devon	20,717	9,000	75	675,000
Dutch-Belted	1,524	600	200	120,000
Guernsey	24,337	15,000	140	210,000
Holstein-Friesian	115,009	75,000	130	9,750,000
Jersey	237,680	125,000	100	12,500,000
Polled Durham	6,077	5,000	80	400,000
Polled Jersey	286	250	100	25,000
Red Polled	30,330	25,000	150	3,750,000
Shorthorn ^a	564,839	420,000	170	71,400,000

^a Numbers and average value refer chiefly to beef stock.

TABLE XXII.—*Growth of the factory system in the United States—States, years, and number of factories, from various sources.*

	Year,	Num- ber.		Year.	Num- ber.		Year.	Num- ber.
United States ...	1850	8	Iowa	1866	1	Ohio	1850	2
	1860	10		1870	14		1862	1
	1861	56		1874	45		1874	108
	1864	402		1888	468		1880	452
	1870	1,313		1894	870		1890	361
	1900	9,355		1900	907		1900	484
Connecticut	1851	1	Maine	1869	1	Vermont	1870	28
	1870	7		1874	40		1874	32
	1880	16		1880	41		1880	85
	1890	50		1890	42		1890	124
	1900	72		1894	58		1894	250
Illinois.....	1862	1		1900	61		1900	255
	1874	45	New York	1851	1	Wisconsin	1841	1
	1875	200		1861	3		1864	2
	1890	266		1864	269		1865	30
	1894	530		1865	484		1872	150
	1900	534		1874	1,018		1874	175
				1900	1,928		1900	2,019

The first cheese factory and first creamery were started, respectively, in New York in 1861 and 1864; in Illinois, 1862 and 1870; in Iowa, 1866 and 1871.

DAIRY STATISTICS LATER THAN 1900 RELATING TO SEVERAL STATES.

CALIFORNIA.

[From the Fourth Report of the State Dairy Bureau.]

There were (October 1, 1902) 4,320 farmers and dairymen owning herds of 10 or more cows who were engaged in the production of butter, cheese, or milk. In the same year there were in the State 292 creameries, 341 cheese factories, and 5 condensed-milk factories. The amount of creamery butter made in 1901 was 19,017,512 pounds, and, in 1902, 21,593,021 pounds. The annual value of the dairy output was as follows:

Output of dairy products in 1900-1901.

29,730,889 pounds of butter	\$6, 838, 103
5,679,566 pounds of cheese	567, 956
100,140 cases of condensed milk and cream	380, 532
Milk and cream consumed	6, 236, 557
Calves from dairy cows	1, 422, 603
Hogs produced at dairies and creameries	1, 641, 459
	17, 087, 210

Output of dairy products in 1901-02.

31,424,135 pounds of butter	\$7, 541, 792
6,503,441 pounds of cheese	702, 371
146,680 cases of condensed milk and cream	564, 758
Milk and cream consumed	6, 236, 555
Calves from dairy cows	1, 568, 040
Skim milk, etc., made into pork	1, 710, 040
	18, 323, 556

COLORADO.

[From the Annual Report, November, 1902, of T. L. Munson, State Dairy Commissioner.]

The number of creameries, cheese factories, and skimming stations was 86 in 1902. The total number of dairy cows was 81,546, of which 26,160 supplied market milk, 20,000 supplied the creameries, and 2,500 supplied the cheese factories. The milk from 12,000 was used in making ranch butter, and 500 supplied milk to condensed-milk factories; the remainder were dry.

Value of dairy products, 1902.

6,716,000 pounds creamery butter, at 25 cents	\$1, 679, 000
2,336,000 pounds of ranch butter, at 20 cents	467, 200
1,788,500 pounds cheese, at 14 cents	250, 390
518,400 cans condensed milk, at 8½ cents (average)	43, 198
5,840,000 quarts cream consumed and used in ice cream manufacture, at 16 cents	934, 400
89,936,000 quarts pure milk consumed, at 3¼ cents per quart, wholesale	2, 922, 920
Skim milk and buttermilk, at one-half cent per quart, whole- sale	332, 880
All dairy products	6, 629, 988

INDIANA.

[From township assessors' returns furnished by B. F. Johnson, Chief Indiana Bureau of Statistics, for the year 1902.]

Number of milch cows	543, 648
Butter made on farms, pounds	34, 755, 464
Cheese made on farms, pounds	6, 762, 731
Milk produced on or sold from farms, gallons	145, 602, 678
Creameries	58
Cheese factories	2

IOWA.

[From the 1901 Report of the Iowa State Dairy Commissioner.]

	1899.	1900.	1901.
Number of patrons of creameries	90, 364	91, 417	89, 376
Average number of patrons per creamery	116	113	114
Total number of cows contributing to creameries	625, 512	631, 829	627, 984
Average number of cows per creamery	804	781	801
Average number of cows per patron	7	7	7
Number of creameries that use Mann's acid test		85	139
Number of creameries that use Farrington's test		22	35
Number of creameries that pasteurize the skimmed milk	78	205	270

[From the 1902 Report of the Iowa State Dairy Commissioner, H. R. Wright.]

Number of cows per 1,000 persons	637
Number of cows per square mile	25
Number of milch cows in the State	1, 423, 348
Value of cows	\$34, 540, 890
Number of creameries	920
Number of creamery patrons	81, 532
Number of cheese factories	52
Butter made in creameries and factories, pounds	77, 885, 696
Cheese made in creameries and factories, pounds	3, 511, 798
Average price of Iowa butter at New York, cents	24. 16
Number of farm separators	8, 323

The number of farm separators reported in 1898 was 904; in 1899, 1,762; in 1900, 3,332; in 1901, 5,231; in 1902, 8,323—showing an increase of nearly 60 per cent, while in 1903 there were 16,800, an increase of over 100 per cent. The 13 renovated-butter factories manufactured 4,530,388 pounds of renovated butter. Of the “packing

stock" for this product, 1,469,281 pounds was purchased in Iowa and 3,061,107 pounds was purchased elsewhere. Almost 1,000,000 pounds of this renovated butter was consumed within the State.

KANSAS.

[Returns from the State Board of Agriculture Report for 1902.]

Number of milch cows.....	791, 844
Value of milch cows.....	\$23, 755, 320
Butter made on farms, pounds.....	27, 056, 683
Butter made in creameries and factories, pounds.....	17, 294, 146
Value of total butter made.....	\$7, 517, 332
Cheese made on farms.....	147, 179
Cheese made in creameries and factories, pounds.....	2, 878, 476
Value of total cheese made.....	\$302, 565
Value of milk sold otherwise than for butter and cheese....	\$725, 380

MINNESOTA.

[Statistics furnished by W. W. P. McConnell, State Dairy Commissioner.]

For 1902.

Milk received at creameries and cheese factories, pounds..	1, 151, 684, 174
Butter made, pounds.....	63, 726, 808
Amount paid to creameries for butter sold.....	\$13, 909, 898
Cheese made, pounds.....	3, 291, 171
Amount paid to cheese factories for cheese sold.....	\$292, 286
Total for butter and cheese (factory product).....	\$14, 202, 183

For 1903.

January 1, 1903, there were in operation 681 creameries (526 cooperative and 155 independent or individual), 53 skimming stations, and 141 cheese factories. The number of cows supplying milk to creameries and cheese factories was 382,356.

Report of Cheddar cheese industry for 1901.

Milk received by factories, pounds.....	33, 896, 724
Cheese made, pounds.....	3, 291, 171
Milk for 1 pound of cheese, pounds.....	10. 3
Price per 100 pounds of milk paid patrons, cents.....	75. 6
Cheese shipped outside of State, pounds.....	187, 803
Cheese sold within the State, pounds.....	3, 103, 368
Total amount of money paid patrons for milk.....	\$255, 581
Total number of Cheddar cheese factories.....	54

The statistics below combine the make of Swiss, Brick, and Limburger cheese made in the State. The report shows a wonderful increase over two years ago:

Report of sweet-curd industry for 1901.

Milk received by factories, pounds.....	5, 097, 824
Cheese made, pounds.....	408, 429
Milk for 1 pound of cheese, pounds.....	10. 5
Price paid patrons for 100 pounds milk, cents.....	71
Cheese sold outside State, pounds.....	9, 281
Cheese sold within State, pounds.....	399, 148
Total amount of money paid patrons for milk.....	\$36, 704
Total number of sweet-curd cheese factories.....	14

NEW YORK.

[From Bulletin No. 6, State Department of Agriculture, and letter from Geo. L. Flanders, assistant commissioner, July 15, 1903.]

New York has 61 counties; dairy establishments are operated in 52 of them. Statistics are as follows for the year 1902:

Establishments.	Fac- tories.	Butter.	Cheese.
	Number.	Pounds.	Pounds.
Butter factories.....	448	40,060,478	
Cheese factories.....	1,010		90,006,802
Factories making both butter and cheese.....	193	5,117,251	29,282,911
Milk stations.....	539	4,646,561	4,058,523
Condenseries.....	18	95,504	639,280
Total.....	2,208	49,919,794	123,987,516

Increased number of pounds of butter over 1900..... 10,736,483

Decreased number of pounds of cheese as compared with
1900..... 2,671,156

Pounds of dried casein made in 1902..... 6,394,711

Received at milk stations and condenseries, 1902 (milk in
quarts)..... 594,815,567

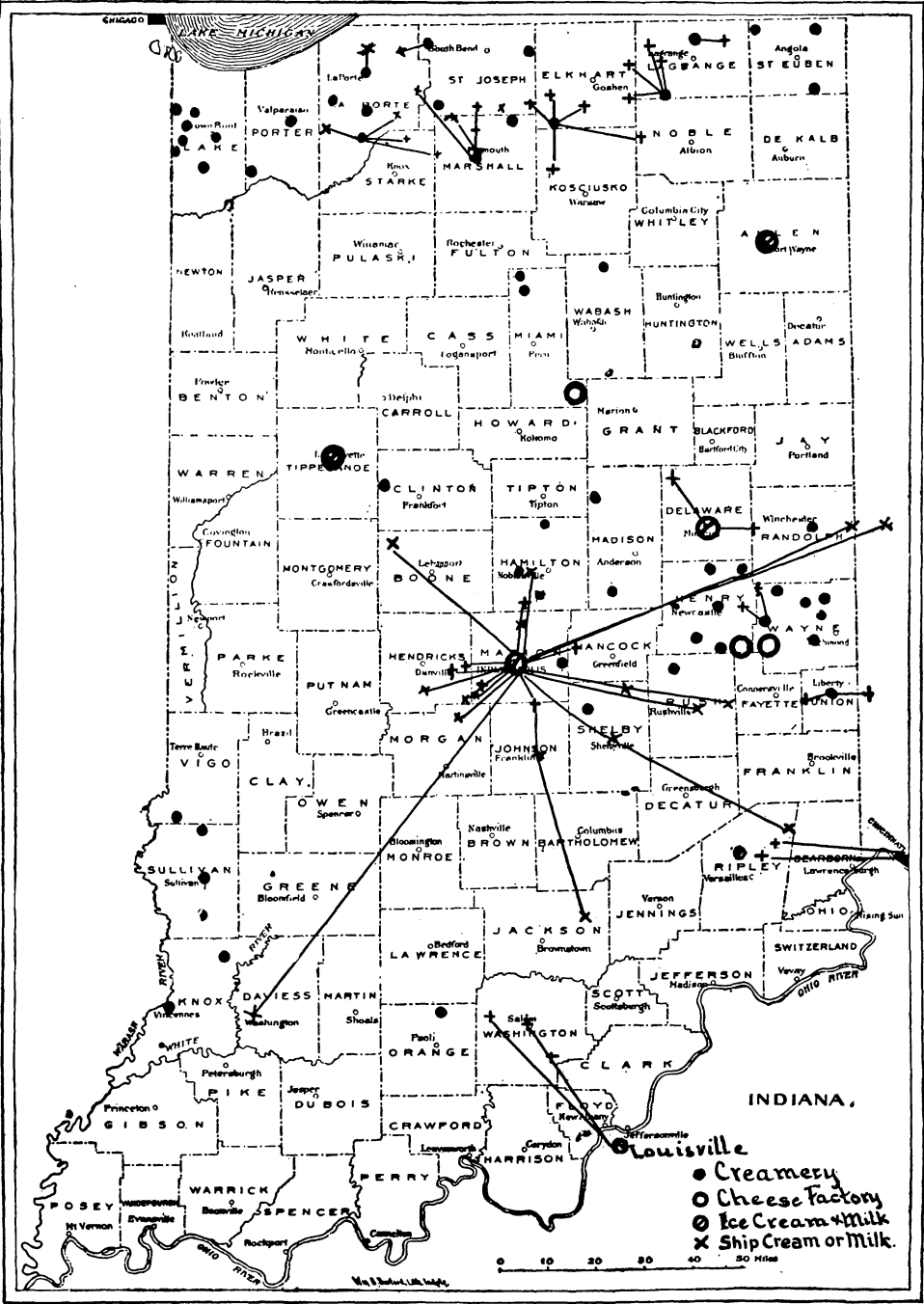
Milk sold, quarts..... 383,498,501

Cream sold, quarts..... 15,152,363

Condensed milk made, quarts..... 35,344,450

The production of cheese is divided as to variety as follows:

Kind.	1900.	1902.
Full cream.....	105,824,927	99,074,630
Skim.....	9,222,638	12,128,367
Pineapple.....	24,480	157,960
Limburger.....	2,897,434	4,531,932
Domestic Swiss.....	588,622	879,533
Kosher.....	10,530	438,687
D'Isigny.....	821,747	1,292,992
Neufchâtel.....	1,171,305	1,605,042
Fromage de Brie.....	141,890	510,312
Square cream.....	457,685	1,446,229
Imitation English Cheddar.....	4,869,928	816,150
Wiener.....		4,000
Sage.....	24,319	680
Munster.....	391,667	2
Other kinds.....	40,000	



MAP OF INDIANA, WITH LOCATION OF CREAMERIES, ETC.

STATE OF IOWA

Scale, ten miles to an inch

Area in square miles, 56,025

Admitted to the Union as a State in the year 1845

First creamery established in the year 1871

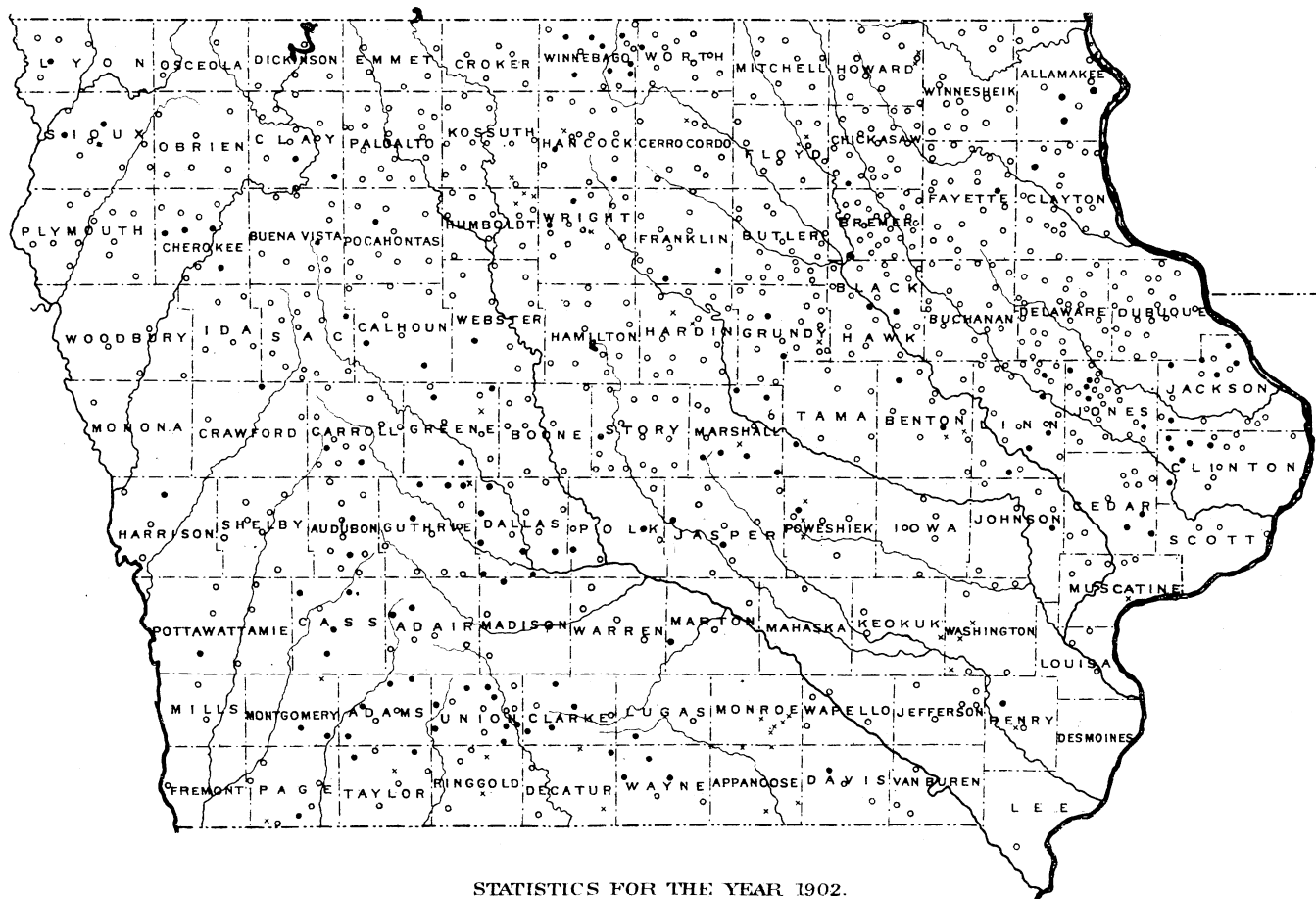
Number of cows estimated in the year 1871, 400,000

Population in the year 1871, 1,225,000

Number of cows in the year 1900, 1,479,676

Population in the year 1900, 2,231,853

Creameries o
 Cheese Factories x
 Butter and Cheese Factories •
 Skimming Stations •



STATISTICS FOR THE YEAR 1902.

Number of creameries in Iowa, 920.

Output of butter from creameries and factories, 77,885,696 pounds.

The creameries produce more than one-half of the total butter product of the State.

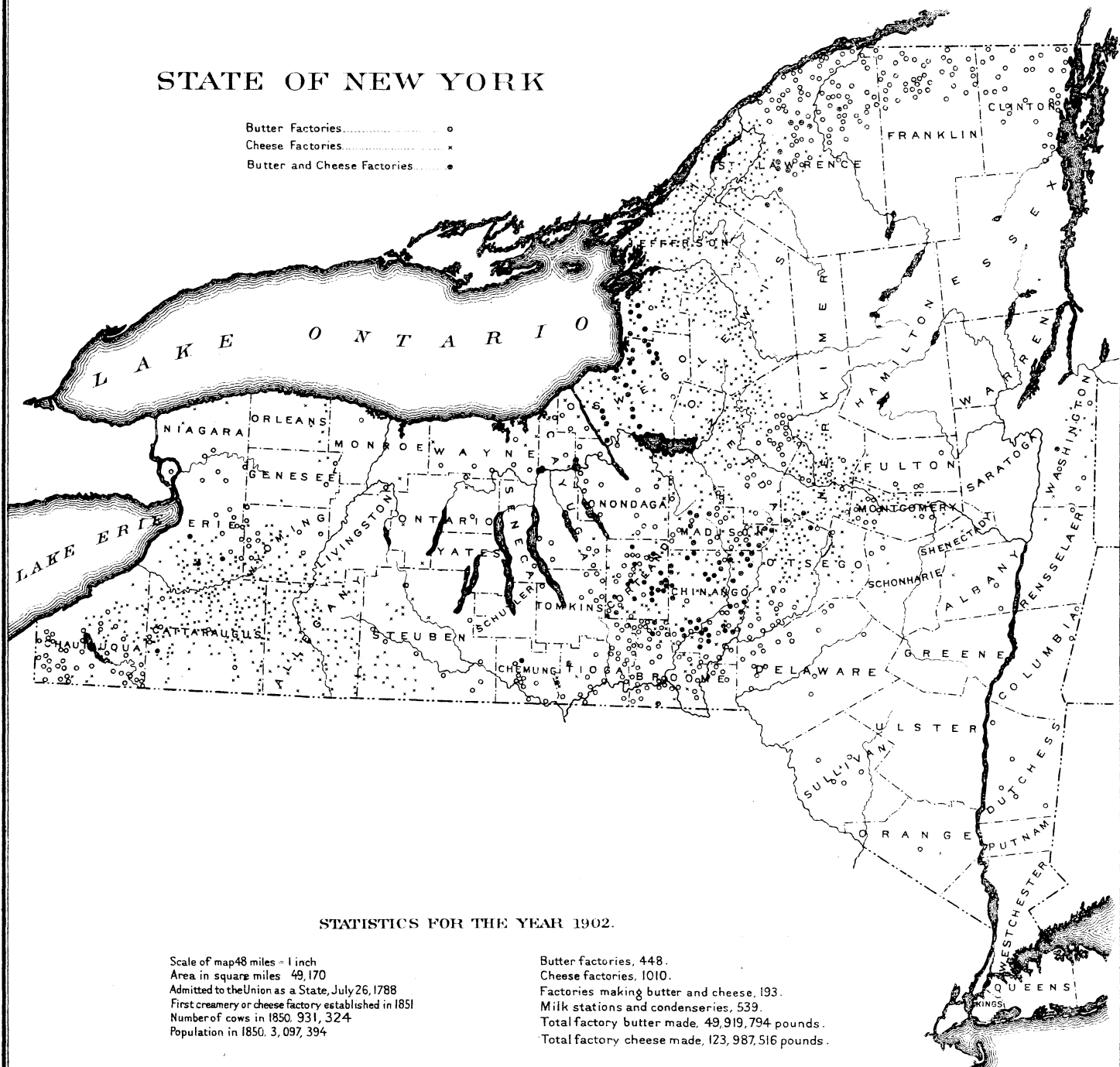
Number of cheese factories, 52.

Output of cheese from factories 3,511,798 pounds.

Number of farm separators, 8,323.

STATE OF NEW YORK

- Butter Factories.....○
 Cheese Factories.....×
 Butter and Cheese Factories.....●



STATISTICS FOR THE YEAR 1902.

Scale of map 48 miles = 1 inch
 Area in square miles 49,170
 Admitted to the Union as a State, July 26, 1788
 First creamery or cheese factory established in 1851
 Number of cows in 1850, 931,324
 Population in 1850, 3,097,394

Butter factories, 448.
 Cheese factories, 1010.
 Factories making butter and cheese, 193.
 Milk stations and condenseries, 539.
 Total factory butter made, 49,919,794 pounds.
 Total factory cheese made, 123,987,516 pounds.



MAP OF OHIO WITH LOCATION OF CREAMERIES, ETC.

NORTH DAKOTA.

[From annual report of Commissioner of Agriculture and Labor, E. E. Kaufman, assistant dairy and food commissioner.]

Number of cattle, 1902.....	463, 751
Value of all cattle	\$6, 287, 885
Number of cows used for dairying	73, 571
Number of cheese factories, October, 1902.....	4
Number of creameries	37
Number of skimming stations	5
Number of creamery patrons.....	1, 750
Number of milch cows owned by patrons	13, 921
Butter made at creameries, 1901, pounds.....	1, 796, 576
Butter made on farms, 1901, pounds	5, 794, 538
Cheese made on farms, 1901, pounds.....	35, 653
Total value of milk sold	\$293, 912
Number of creameries, 1903	56
Number of skimming stations, 1903.....	5

The first creamery was started in 1895. Nearly 1,000 separators were sold to farmers in this State in 1902, so that there are fully 2,000 of these machines now in use. In addition to the butter and cheese manufactured within the State, many thousands of pounds of cream were shipped to Minneapolis, Minn., and Aberdeen, S. Dak.

OHIO.

[Statistics compiled by J. W. Decker, Columbus, Ohio.]

There are in Ohio (1902) about 800,000 milch cows, valued at \$25,000,000. The farms on which they are kept are cared for by an army of 80,000 men. The creameries, cheese factories, etc., are as follows:

	Coopera- tive.	Private.	Stock com- pany.	Not re- ported.	Total.	Number of coun- ties dis- tributed.
Butter factories	53	87	6	2	148	54
Skimming stations	18	56	2	1	77	30
American cheese factories	5	107		2	114	18
Swiss cheese factories	61	31			92	8
Total of classification	137	281	8	5	431	65
Milk shipping stations					22	10

OREGON.

[J. W. Bailey, State dairy commissioner.]

Number of cheese factories, 1902	175
Number of creameries, 1902	141
Cheese made in factories, estimated, pounds.....	2, 235, 000
Butter made in creameries, estimated, pounds.....	4, 000, 000
Dairy butter marketed in the State, estimated, pounds.....	3, 500, 000
Cream and milk sales, estimated	\$1, 800, 000
Value of dairy products (not including those consumed on farms)	\$3, 597, 000

The output of butter and cheese in the past two years has increased, according to the best information obtainable, about 50 per cent. There has also been a rapid increase in the number of creameries.

WASHINGTON.

[E. A. McDonald, State Dairy Commissioner.]

	1901.	1902.
Number of creameries	247	345
Creamery butter.....pounds.	4, 886, 828	5, 883, 251
Number of cheese factories	37	41
Output from cheese factories.....pounds.	1, 105, 933	1, 128, 735

VERMONT.

[From the Thirty-third Report of the Vermont Dairymen's Association, 1903.]

The creameries and cheese factories are classed as follows:

	Proprietary.	Cooperative.	Not stated.	Number of counties represented.
190 creameries	83	102	5	14
51 cheese factories	26	24	1	8

WISCONSIN

[J. Q. Emery, State dairy and food commissioner.]

There were in Wisconsin, in 1902, 1,151 creameries and 1,826 cheese factories. Estimates are as follows:

Butter made in creameries and on farms, pounds.....	118, 750, 000
Cheese made, pounds.....	90, 360, 000
Value of butter	\$23, 745, 000
Value of cheese	\$9, 036, 000
Value of condensed milk	\$347, 000
Value of by-products sold.....	\$700, 000
Value of milk and cream consumed	\$8, 500, 000
Increase in value of stock.....	\$2, 500, 000
Total value of dairy products	\$55, 000, 000

The Swiss cheese industry, which had its inception when a little colony of Swiss settled in Green County over fifty years ago, has developed until that county alone has over 243 factories, and the output of 500 factories reaches 15,000,000 pounds annually, contributing materially to the prosperity of that portion of the State.

STATISTICS OF CATTLE, COWS, AND DAIRY PRODUCTS OF FOREIGN COUNTRIES.

Table XXIII gives the number of cows and cattle in countries where such statistics have been collected. In most cases figures are given for two dates, showing increase or decrease in stock raising. The figures are taken from official documents and such reliable publications as the Agricultural Returns for Great Britain, the Statesman's Year Book, Mohr's Statistics of Stock Raising and Dairying in Foreign Countries (Hamburg), and special consular reports.

TABLE XXIII.—*Cows and cattle of foreign countries for stated years.*

[From various authorities.]

Countries.	Year.	Cows.	All cattle.	Year.	Cows.	All cattle.
		<i>Number.</i>	<i>Number.</i>		<i>Number.</i>	<i>Number.</i>
Algeria	1891	.....	1,233,051	1899	.....	1,045,102
Argentina	1888	.....	21,961,657	1895	1,800,799	21,701,526
Australasia	1892	1,249,720	12,343,853	1899	1,486,832	11,049,065
Australia	1892	1,029,720	11,522,052	1899	1,143,276	9,838,626
New South Wales	1892	365,110	2,147,074	1899	399,327	1,967,081
Queensland	1892	125,000	6,591,416	1899	<i>a</i> 131,000	5,053,836
South Australia	1892	79,420	625,887	1899	84,498	526,524
Victoria	1892	417,177	1,824,704	1901	521,612	1,602,384
Western Australia	1892	8,000	162,886	1899	22,500	297,081
Tasmania	1892	35,013	170,085	1899	41,482	160,204
New Zealand	1892	220,000	821,801	1900	372,416	1,256,680
Austria	1890	4,254,303	8,643,936	1900	4,744,608	9,506,626
Belgium	1895	802,271	1,420,978	1901	834,025	1,646,320
Brazil	1891	.....	17,000,000	1900	.....	<i>a</i> 20,000,000
Canada	1891	1,857,112	4,120,586	.....	.....	.....
British Columbia	1891	17,504	126,919	1901	.....	125,002
Manitoba	1891	82,712	230,696	1902	.....	282,343
New Brunswick	1891	106,649	204,692	.....	.....	.....
Nova Scotia	1891	141,684	324,772	1901	.....	316,174
Ontario	1894	876,167	1,940,673	1902	1,010,746	2,562,584
Quebec	1891	549,454	969,312	.....	.....	.....
Prince Edward Island	1891	45,849	91,695	1901	.....	112,777
The Territories	1891	37,003	231,827	1901	.....	591,739
Cape of Good Hope	1893	.....	1,929,800	1899	<i>a</i> 650,000	1,077,044
Ceylon	1893	.....	1,062,776	1900	.....	1,397,818
Chile	1882	.....	311,000	1898	.....	<i>b</i> 500,000
Cuba	1892	.....	2,485,766	1901	.....	2,455,788
Denmark	1888	954,250	1,459,527	1902	1,100,000	<i>c</i> 1,743,440
Finland	1890	.....	928,276	1899	.....	1,457,423
France	1890	6,509,325	13,562,685	1901	8,068,857	14,673,810
Germany	1892	9,946,164	17,555,694	1900	10,458,631	18,939,692
Hungary	1880	2,035,217	5,311,378	1895	2,185,224	6,738,365
India	1890	.....	49,635,590	1900	21,846,961	<i>d</i> 51,104,177
Italy	1881	2,356,556	4,783,232	1890	.....	<i>a</i> 5,000,000
Jamaica	1893	.....	110,720	1899	.....	118,900
Japan	1890	613,522	1,044,976	1900	649,942	1,261,214

a Estimated.

b Are reared annually.

c 1898.

d Does not include buffaloes.

TABLE XXIII.—*Cows and cattle of foreign countries for stated years—Continued.*

Countries.	Year.	Cows.	All cattle.	Year.	Cows.	All cattle.
		<i>Number.</i>	<i>Number.</i>		<i>Number.</i>	<i>Number.</i>
Netherlands.....	1890	900,500	1,532,800	1899	958,400	1,646,500
Newfoundland.....	1891	.....	23,822	1899	10,863	.....
Norway.....	1875	741,598	1,016,617	1900	689,563	950,201
Paraguay.....	1891	.....	861,954	1900	.....	2,743,665
Poland.....	1888	.....	3,013,392	1900	.....	3,003,629
Roumania.....	1890	.....	2,520,380	1900	1,838,039	2,589,040
Russia in Europe.....	1888	.....	^a 24,609,264	1898	.....	43,586,900
Servia.....	1895	289,501	915,428	1900	^b 300,000	942,087
Spain.....	1880	.....	2,460,253	1895	.....	2,217,659
Sweden.....	1890	1,578,927	2,399,491	1899	1,766,915	2,582,555
Switzerland.....	1886	663,102	1,212,538	1901	739,922	1,340,375
United Kingdom.....	1895	3,937,590	10,753,314	1902	4,084,305	11,376,969
England.....	1895	1,786,370	4,472,565	1902	1,841,356	4,611,937
Scotland.....	1895	423,967	1,177,947	1902	438,890	1,222,165
Ireland.....	1895	1,433,960	4,358,041	1902	1,510,701	4,782,204
Wales.....	1895	275,483	702,824	1902	275,880	721,874
Isle of Man.....	1895	7,399	21,136	1902	6,910	20,271
Channel Isles { Jersey.....	1895	6,748	12,282	1902	6,686	11,936
{ Guernsey.....	1895	3,663	7,519	1902	3,882	6,582
United States.....	1890	16,511,950	51,363,572	1900	18,112,707	^c 69,438,758
Uruguay.....	1892	.....	5,487,604	1901	.....	6,326,601

^aExclusive of Poland.^bEstimated.^cIncludes Alaska and Hawaii.

Some countries have a very small number of cattle in proportion to the population. The number of cows alone does not show the condition of the dairy industry, however, for in many places large numbers of buffalo, reindeer, goats, etc., supply milk and meat.

The United States is far in the lead of all foreign countries in the extent of its stock-raising interests and the annual value of its dairy products.

Dairying is carried on extensively and successfully in certain parts of Europe, and some statistical information regarding this industry is accessible, although far from being as complete as could be desired.

CANADA.

Canada has made rapid advances in the dairy industry in recent years. Cheese is the product of greatest commercial importance, although butter making for export is also receiving much attention. The following table illustrates this development:

Exports of dairy products from Canada.

Year.	Butter.		Cheese.	
	<i>Pounds.</i>	<i>Dollars.</i>	<i>Pounds.</i>	<i>Dollars.</i>
1893.....	7,036,013	1,296,814	133,946,365	13,407,470
1900.....	25,259,737	5,122,156	185,984,430	19,856,324
1901.....	16,335,528	3,295,663	195,926,397	20,696,951
1902.....	27,855,978	5,660,541	200,946,401	19,686,291

Almost all the butter and cheese exported goes to Great Britain, the export of butter to that country in 1901 being valued at \$3,142,353, and cheese at \$20,609,361, and in 1902 \$5,459,300 for butter and \$19,620,239 for cheese.

ONTARIO.

Ontario is the leading dairy province of Canada. It is about four times as large as Michigan and has less than half as many cows per square mile. It produces about one-fifth as much cheese per square mile as New York State.

Particulars of cheese and butter factories in Ontario, 1901.

Product.	Number of factories.	Amount made.	Gross value.	Milk required to make 1 pound.	Value per pound.	Amount paid to patrons.	Average number of patrons.
		<i>Pounds.</i>	<i>Dollars.</i>	<i>Pounds.</i>	<i>Cents.</i>	<i>Dollars.</i>	
Cheese	1,167	134,942,517	12,269,073	10.63	9.09	10,814,538	59,377
Butter	286	9,047,260	1,798,264	.....	19.88	1,549,576	19,896

Ontario in 1902 had 2,562,584 head of neat cattle, 1,010,746 of these being cows. Using the population of 1901, we find 117.4 neat cattle and 46.3 cows per 100 persons. The number of cows per 100 persons is greater than in any of the European countries, although the cows constitute only 39.4 per cent of the total cattle.

PRINCE EDWARD ISLAND.

In Prince Edward Island in the season of 1901, 37,230,775 pounds of milk was made into cheese in 43 factories. The amount of cheese made was 3,597,689 pounds, showing an average of 10.40 pounds of milk to one pound of cheese, and the average price of cheese for the season was 9.01 cents per pound. The cost of manufacturing was \$2.11 per 100 pounds, and the net value of the milk per 100 pounds varied from 60 to 70 cents. Twenty-seven of these cheese factories made butter, and, together with 5 creameries, produced 633,679 pounds of butter, valued at \$132,792.

NEW BRUNSWICK.

New Brunswick in 1902 had 55 cheese factories with an output of 1,910,733 pounds. This was valued at 9.92 cents per pound and 10.14 pounds of milk were required for 1 pound of cheese. There were 40 creameries which made 750,911 pounds of butter, with an average selling price of 20.37 cents per pound, and 21.52 pounds of milk were required for 1 pound of butter.

MANITOBA.

The cheese factories in Manitoba in 1902 made 1,093,653 pounds of cheese, selling at 10.19 cents per pound, while the creameries made

1,406,450 pounds of butter, selling at 18.60 cents per pound. In 1901 about 2,748,090 pounds of butter were marketed by farmers, at an average value of 14.04 cents per pound, and in 1902, 2,509,425 pounds at an average of 14.92 cents per pound.

NOVA SCOTIA.

Nova Scotia in 1901 had 7 cheese factories, 8 creameries, and 6 combined butter and cheese factories. The products from these were 316,180 pounds of cheese and 266,109 pounds of butter.

BRITISH COLUMBIA.

British Columbia in 1901 had 8 creameries which produced 601,329 pounds of butter.

THE TERRITORIES.

The Territories (of Canada) had 19 creameries in 1902. Their product was 586,171 pounds of butter, valued at \$116,827, which was an average of 19.93 cents per pound.

GREAT BRITAIN AND IRELAND.

The number of neat cattle and cows for the last ten years are compared in the following table:

Year.	Number of neat cattle.	Number of cows.	Year.	Number of neat cattle.	Number of cows.
1892.....	11,519,417	4,120,451	1900.....	11,455,009	4,096,682
1896.....	10,941,655	3,958,762	1902.....	11,338,180	4,066,827

In 1902, for every 100 persons there were 27.3 neat cattle and 9.8 cows.

Estimated production of milk, butter, and cheese.

Period or year.	Total number cows and heifers in milk.	Number of cows per 1,000 population.	Number of cows giving milk all the year (75 per cent of total).	Estimated total milk produced, tons. ^a	Estimated total butter produced, tons. ^b	Estimated total cheese produced, tons. ^c
1887 to 1891, average for 5 years.....	3,937,556	105.8	2,953,167	7,355,607	84,063	144,485
1892 to 1896, average for 5 years.....	3,991,269	102.8	2,993,515	7,098,586	81,094	137,999
1897 to 1901, average for 5 years.....	4,070,332	100.0	3,052,529	7,302,301	85,731	144,577
The year 1900.....	4,096,682	100.1	3,072,512	7,753,484	88,611	152,300
The year 1901.....	4,102,061	98.7	3,076,546	7,236,036	82,653	142,136

^a Produced in 52 weeks by 75 per cent of total herd, at 49 hundredweight, or 531 gallons, per cow.

^b Produced in 52 weeks, taking 32 per cent of total milk to yield 80 pounds of butter per ton of milk.

^c Produced in 52 weeks, taking 20 per cent of total milk to yield 220 pounds of cheese per ton of milk.

Homemade English Cheddar retails at 20 cents per pound, while imported Cheddar cheese is 13 cents per pound. Butter for general use retails very uniformly at 24 cents per pound throughout the year. About 15 gallons of milk are consumed yearly per capita.

The returns from 195 cooperative dairy societies (creameries) in Ireland for 1901 were as follows:

Membership	33,064
Sales of butter, value in pounds sterling	717,902
Milk received, gallons	37,161,892
Butter produced, pounds	15,345,942
Milk per pound of butter, gallons	2.4
Average price milk per gallon, pence	3.97
Average price per pound of butter, pence	11.22
Cost of making, per pound, pence	1.29

Importation in hundredweights (112 pounds) by the United Kingdom.

Year.	Butter.	Cheese.	Condensed milk.	Year.	Butter.	Cheese.	Condensed milk.
1892.....	2,183,009	2,232,817	481,374	1900.....	3,378,516	2,705,878	.....
1895.....	2,825,662	2,133,819	549,394	1901.....	3,702,810	2,586,837	921,020
1898.....	3,209,153	2,339,452	817,274	1902.....	3,974,177	2,546,384	.....

The imports of butter by countries in 1902 were as follows:

	Cwts.		Cwts.
Australia	80,460	Holland	393,261
Canada	285,765	Russia	489,091
New Zealand.....	157,993	Sweden.....	191,591
United States	54,458	Other countries.....	177,967
Denmark	1,703,032		
France	414,141	Total	3,974,177
Germany	26,418		

The cheese imported from Canada in 1902 amounted to 1,709,566 hundredweights. Nearly all the imported cheese is of the Cheddar variety.

In 1901 the greater part of the condensed milk came from France (of Swiss origin), 340,118 hundredweights; the Netherlands, 341,209 hundredweights; Norway, 100,036 hundredweights; and the United States, 73,016 hundredweights.

VICTORIA.

Victoria, the leading dairy colony of Australia, had, in 1901, 1,602,384 neat cattle, of which 521,612 were cows; this was 133.4 neat cattle and 43.4 cows per 100 persons. There were 238 butter and cheese factories, with 372 branches.

The approximate output, consumption, and export of butter is as follows:

	1899.	1900.	1901.
	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>
Output.....	69,144,187	72,180,959	65,154,075
Consumption.....	32,906,718	34,387,798	36,007,682
Export.....	36,237,469	37,793,161	29,146,393

NEW SOUTH WALES.

New South Wales had 420,148 dairy cows in 1900, yielding 149,-153,000 gallons of milk. Of this, 114,069,000 gallons were used for butter and 3,559,000 gallons for cheese. The average yield of milk per cow was 355 gallons per annum. The butter exported in 1900 amounted to nearly 8,500,000 pounds, and the total value of dairy products is estimated at \$13,756,187.

NEW ZEALAND.

The government of New Zealand is doing all it can to promote the dairy industry. Perhaps no country is its superior for the production of milk from natural grasses and fodders, while the climate is so favorable that the cattle do not require to be wintered in expensive stables. During the year ended March 31, 1902, the exports of butter and cheese amounted to 219,493 hundredweights and 86,476 hundredweights, respectively, valued at over \$1,000,000. This was an increase of 20 per cent over the previous year.

In 1900 there were 1,256,680 neat cattle, of which 372,416 were cows; this was 151.5 neat cattle and 44.9 cows for every 100 inhabitants, the number of cows being 21.7 per cent that of the total cattle.

DENMARK.

Denmark is about one-third the size of New York. The neat cattle and cows of Denmark for previous years are:

Census year—	Total number of cattle.	Number of cows.
1881.....	1,470,078	898,790
1888.....	1,459,527	954,250
1893.....	1,696,190	1,011,098
1898.....	1,743,440	1,067,139

By taking the population of 1901, for every 100 persons there are 70.7 neat cattle and 43.4 cows, the cows forming 61.2 per cent of the total cattle.

In 1902 there were in Denmark 1,250 creameries, 20 cheese factories, and 500 combined butter and cheese factories. Very little butter is made on small farms, but large estates have creameries of their own. A very large part of the creameries of Denmark, however, are cooperative establishments. The 1,100,000 milch cows produced 653,833,125 gallons of milk—an average of 594 gallons per cow.

The total butter made in 1902 amounted to 181,879,500 pounds, 26 pounds of milk being required for 1 pound of butter. The butter exports for the year ended October 30, 1902, were 193,061,998 pounds, and the imports 54,138,811 pounds, leaving a net exportation of 138,823,187 pounds. The imports were mainly Finnish and Russian (Siberian) butters, intercepted by enterprising merchants for reexport. The Danish imports and exports of cheese have been, in recent years, as follows: Imports in 1894, 816,704 pounds; in 1899, 1,248,800 pounds; and in 1901, 1,086,400 pounds; exports in 1894, 23,408 pounds, and in 1901, 61,600 pounds.

The export of oleo, or margarine, from Denmark is not permitted, although large quantities are produced, under Government regulations, for consumption within the country, and there is a considerable import. The Danes consume 18½ pounds of margarine per capita, this rate having risen from 5½ pounds per capita within ten years.

A striking feature in the dairying of Denmark is the great number of small farms and small dairy herds. This is well shown by the following table:

Number of farmers owning 1 cow.....	20,500
Number of farmers owning 2 cows.....	27,700
Number of farmers owning 3 to 5 cows.....	26,800
Number of farmers owning 6 to 9 cows.....	25,400
Number of farmers owning 10 to 14 cows.....	19,800
Number of farmers owning 15 to 29 cows.....	29,800
Number of farmers owning 30 to 49 cows.....	5,800
Number of farmers owning 50 to 99 cows.....	1,440
Number of farmers owning over 100 cows.....	6,762

SWEDEN.

The development of the cattle industry will be shown by the following figures:

Census year.	Total number of cattle.	Cows.
1880.....	2,227,757	1,409,236
1890.....	2,399,491	1,578,927
1895.....	2,540,225	1,705,604
1899.....	2,583,065	1,766,915

For each 100 persons there are now 50.3 neat cattle and 34.4 cows, the cows forming 68.4 per cent of the total number of cattle. In 1902 over 700,000,000 gallons of milk was produced, and 121,253,000 pounds of butter made, of which about 42,000,000 pounds were exported.

There are 1,215 creameries, 287 cheese factories, and 186 combined butter and cheese factories. The total quantity of milk handled by these factories was 1,857,228,670 pounds. From this was made 57,570,963 pounds of butter, 7,199,637 pounds full-cream cheese, 3,226,145 pounds half-cream cheese, 403,021 pounds quarter-cream cheese, and 5,563,401 pounds skim-milk cheese. The number of butter and cheese factory patrons was 68,947. The average yearly consumption of butter in Sweden is estimated at only 12 pounds per capita. The Government supports a dairy college, two dairy schools, and several stations for training dairy maids. There are also a number of small dairy schools supported by large landed proprietors.

NORWAY.

The number of cattle and of cows of previous years are as follows:

Census year.	Total number of cattle.	Cows.
1865.....	953,036	690,777
1875.....	1,016,617	741,598
1890.....	1,006,497	706,925
1900.....	950,201	689,563

In the year last named there were for every 100 persons 45.1 neat cattle and 31.7 cows. Of the total number of cattle 72.6 per cent are cows.

Norway has about 650 creameries. The product in 1901 was 7,716,100 pounds of butter and 9,122,635 pounds of cheese. The Government maintains 9 creamery schools and 1 school for cheese making, besides appropriating about \$2,000 for the advancement of the creamery industry abroad. The value of the butter imported in 1901 was \$119,528, while that exported was \$701,892. The product of 3 condensed-milk factories is exported.

THE NETHERLANDS.

The cattle industry of this country is shown in the following table:

Year.	Total number of cattle.	Cows.
1890.....	1,532,800	900,500
1896.....	1,583,400	916,900
1899.....	1,646,500	958,400

There were, in 1899, 32.3 neat cattle and 18.8 cows per 100 inhabitants, and 58.2 per cent of the cattle were milch cows.

The Netherlands had, in 1900, 873 creameries and 76 cheese factories. The total butter and cheese production was as follows:

Where produced.	Butter.		Cheese.	
	1899.	1900.	1899.	1900.
On farms	68,932,554	65,949,620	110,873,664	113,469,620
In creameries.	52,831,540	54,807,036	36,033,487	44,240,035
In cheese factories	79,867	118,628	6,793,024	8,269,554
Total	121,843,961	120,875,284	153,700,175	165,979,209

It is thus seen that cheese is generally and largely made in the establishments classed as creameries. This means a considerable production of skimmed or partly skimmed cheese. Imports and exports of cheese are thus reported: Imports in 1895, 249,760 pounds; in 1901, 293,664 pounds; exports in 1895, 36,627,360 pounds; in 1901, 52,971,072 pounds. In 1902 the exports to Great Britain were 31,810,016 pounds of cheese and 44,045,232 pounds of butter.

BELGIUM.

Belgium has four-fifths as many milch cows as the State of Pennsylvania, although it is only one-fourth the size of that State. The following figures show the growth of the cattle industry:

Year.	Total number of cattle.	Cows.
1866.....	1,242,445	738,732
1880.....	1,382,815	796,178
1895.....	1,420,978	802,271
1900.....	1,657,494	828,445

In 1900 there were only 24.6 neat cattle and 12.3 cows per 100 inhabitants. The dairy interests are extensive, but fall considerably short of supplying the demand. In 1901 the butter imports and exports were 7,833,241 pounds and 5,926,860 pounds, respectively. The average yearly per capita consumption of butter is 25 pounds. Cooperative creameries are numerous and prosperous in Luxembourg. Imports of cheese amounted to 5,759,040 pounds in 1893 and to 9,924,560 pounds in 1901, while the exports were 81.760 pounds in 1893 and 69,664 pounds in 1901.

FRANCE.

France is over four times as large as the State of New York and has one and one-fourth times as many cows per square mile. The growth of the cattle and dairy industry has been as follows:

Year.	Total number of cattle.	Cows.
1885.....	13, 104, 970	6, 414, 487
1890.....	13, 562, 685	6, 509, 325
1895.....	13, 233, 828	6, 359, 795
1900.....	14, 520, 830	7, 819, 582

In 1901 there were 37.7 neat cattle and 20.7 cows per 100 inhabitants. The milk produced in 1901 amounted to 2,076,079,299 gallons, valued at \$223,758,093, or 10.92 cents per gallon, from 8,068,857 cows. The decennial average 1892-1901 was 2,092,919,265 gallons, valued at \$232,962,981, or 11.12 cents per gallon, from 6,674,863 cows.

For the production of milk France and England are both entitled to occupy third place in Europe. England produces as much milk with a smaller number of cows.

In 1901 the departments furnishing the most milk were:

	Cows.	Gallons.	Cents per gallon.
Nord	203, 074	107, 442, 222	12. 39
Deux Sèvres.....	101, 579	95, 555, 572	9. 00
Ile-et-Vilaine	443, 023	80, 113, 119	11. 65
Calvados	127, 809	69, 048, 147	11. 47
Seine Inférieure.....	170, 941	63, 870, 045	9. 71

The lowest price for milk is obtained in Aube, Haute-Marne, and Finistère (7.3 cents per gallon); the highest, 24.84 cents per gallon, in the department of Seine.

There are 427 creameries and 1,044 cheese factories. In 1902 the imports were 11,813,349 pounds of fresh butter and 147,047 pounds of salted butter, valued at \$3,030,048, while the exports of butter were 29,847,418 pounds, valued at \$14,989,175, giving a surplus of over \$11,500,000. This is due to the small per capita butter consumption, which is probably less than 5 pounds, or not one-fourth of that of the United States. Cheese, on the other hand, is one of the most common articles of food, being made in great variety and consumed in very large quantities. The commerce in cheese is reported as follows, for recent selected years: Imports amounted to 38,111,913 pounds in 1883, 27,871,642 pounds in 1893, and 42,034,017 pounds in 1901, while the exports were 8,377,235 pounds in 1883, 12,388,732 pounds in 1893, and 17,795,097 pounds in 1901.

France in 1901 imported 98,440 pounds of milk sugar and about 1,000,000 pounds of casein.

SWITZERLAND.

The increase in the cattle industry is shown by the following table:

Year.	Total number of cattle.	Cows.
1876.....	1,035,930	592,463
1886.....	1,212,538	663,102
1896.....	1,306,696	688,052
1901.....	1,340,375	739,922

In 1901 there were 40.4 cattle and 22.3 cows for every 100 persons. In this year the milk product amounted to 497,525,000 gallons of cows' milk and 19,875,000 gallons of goats' milk. The average yearly per capita consumption of milk is calculated as 225 liters (238 quarts). There was used 175,673,050 gallons for making cheese and butter, fully two-thirds of this being for cheese. About 66,042,500 gallons was converted into condensed milk. There are about 5,400 cheese dairies, half of which are situated in the mountains. The trade of 1901 was as follows:

Product.	Imports, 1901.		Exports, 1901.	
	Kilos.	Francs.	Kilos.	Francs.
Butter.....	2,323,100	5,585,305	42,900	136,882
Soft cheese.....	1,241,100	1,472,940	36,700	57,823
Hard cheese.....	686,100	791,095	27,213,200	43,976,458
Condensed milk.....	4,900	4,900	30,724,600	28,941,266

Whey butter, made from the fat which separates from the curd during the cooking process in the manufacture of Emmenthaler cheese, is used extensively, and retails at 30 cents a pound.

GERMANY.

The cattle industry has increased as follows:

Year.	Total number of cattle.	Cows.
1883.....	15,786,764	9,086,906
1892.....	17,555,694	9,946,164
1900.....	18,939,692	10,458,631

Using the census figures of 1900 we find that there are 33.6 neat cattle and 18.6 cows per 100 persons. There are in Germany about 6,375 creameries and cooperative societies of dairymen. Most of these make butter, although many only cooperate in collecting and shipping milk to market, or in managing city milk depots. This country has, in

addition, nearly 1,000 private or "estates" dairies, which use steam power and are of sufficient size to be mentioned with the creameries. Of the whole number one-third are in the northwestern German States, one-sixth in Prussia, and an equal portion in Brandenburg and Pomerania.

Statistics show the imports and exports of butter to be as follows, the weights being in kilograms:

Year.	Imports.	Exports.
	<i>Kilos.</i>	<i>Kilos.</i>
1870.....	3,410,000	17,880,000
1888.....	5,170,000	13,650,000
1898.....	8,580,000	2,830,000
1900.....	15,720,000	2,520,000
1901.....	18,007,900	2,466,400

The exports are thus seen to be steadily decreasing, while the imports are increasing in greater proportion.

Butter is imported principally from Denmark, Holland, and Russia. The Berlin market demands a fresh or half-salted butter, while Hamburg requires it very highly salted and preserved with antiseptics. The butter packer at Hamburg mixes good and bad butter together, using strong brine to give it good keeping qualities and also to add weight. Some of these butters contain as high as 30 per cent moisture.

The cheese imported in 1901 amounted to 16,669,700 kilograms, while that exported was 1,456,800 kilograms, leaving a net import of 15,212,900 kilograms. In the same year 1,700 kilograms of condensed milk was imported, while 2,929,700 kilograms was exported.

RUSSIA.

Russia, with its new grass lands in Siberia and now served by the transcontinental railway, shows signs of rapid expansion. In 1900 there were 15 dairy schools in Russia. The dairy development is very largely under the management of Danes. The department of agriculture has allotted \$39,000 to encourage dairy production and export in Siberia. This amount is to be used for the support of creamery instructors to maintain examining laboratories and educational courses, and in the organization of creameries in Western Siberia. Russia exported, in 1902, 2,274,000 poods, or about 82,118,000 pounds, of butter, the exports to England being about 17,500 tons, while in 1892 they were only about 1,000 tons. This increase is due in a large measure to the new Siberian product, which has a good reputation for purity. The price of table butter at Tomsk is about 16½ cents per pound, while the second grade sells at 10 cents per pound. In 1901 Russia imported 1,375,920 pounds of cheese and exported 807,184 pounds.

AUSTRIA.

The cattle industry has increased as follows:

Year.	Total number of cattle.	Cows.
1869.....	7,425,212	3,831,136
1880.....	8,584,077	4,138,625
1890.....	8,643,936	4,254,303
1900.....	9,506,526	4,744,608

Using the census of December 31, 1900, we find that there are 36.4 cattle and 18.1 cows per 100 persons. In Austria there are 774 creameries and cheese factories. In Tyrol alone there are 504 Gruyère cheese-making creameries.

HUNGARY.

The number of cattle has increased as follows:

Year.	Total number of cattle.	Cows.
1870.....	5,279,193	2,052,488
1880.....	5,311,378	2,035,217
1895.....	6,738,365	2,185,224

The extent of the dairy industry of Austria-Hungary in 1901 was as follows:

Product.	Imports.	Exports.
	<i>Kilos.</i>	<i>Kilos.</i>
Butter.....	66,700	7,474,800
Cheese.....	3,296,400	364,100

GREECE.

Dairying in this country is not extensive, yet in 1901 Greek cheese valued at \$16,622 and Greek butter valued at \$343 were imported by the United States. Nearly all the butter was received in the melted state and was unsalted. There are a few dairies that keep cows and use dairy machinery. The amount of cows' butter made in the vicinity of Athens is estimated at 103,660 pounds, while 710,000 pounds of imported butter is consumed there.

The natives use the milk of the goat and sheep, believing it to be more healthy than that of the cow.

ITALY.

In 1890 it was estimated that there were 5,000,000 cattle and 1,800,000 goats. The goats are milked at the door of the consumer. Very little butter is used, olive oil taking its place in cooking. The trade in dairy products in 1901 was as follows:

Product.	Imports.	Exports.
	<i>Kilos.</i>	<i>Kilos.</i>
Butter	332, 600	6, 051, 200
Cheese.....	4, 807, 700	10, 933, 600
Condensed milk.....	7, 300	16, 300

ARGENTINA.

Dairying in Argentina is fast increasing. Since 1895 there have been established several large butter factories, besides importing houses concerned in the introduction of butter-making machinery. Statistics for 1901 show that there are 523 dairies and about 300 cheese factories. One "dairy" is alone capable of producing 5 tons of butter per day. The exports of butter in 1901 had increased to over 3,000 tons, of which Great Britain received 3,281,889 pounds, at an average price a little more than 24 cents per pound. The exports of butter in 1902 had increased to 9,021,026 pounds. The principal dairy is the Granja Blanca, with nearly 5,000 cows in two herds (Las Heras and Escobar farms). This establishment sells pasteurized, maternized, and sterilized milk, as well as condensed milk, kefir, natural milk, butter, casein, and soap.

BRAZIL.

The dairy industry of Brazil is yet in its embryonic state. There is a decided lack of milch cows, although the grazing lands are extensive. That very excellent butter can be made is shown by the product of its German colonies in the south. In 1901 Brazil imported over 1,700,000 pounds of butter, nearly two-thirds of this coming from France.

(Continued from second page of cover.)

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